# THE ATHENÆUM

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For the convenience of Subscribers residing in remote places, the weekly numbers are reissued in Monthly Parts, stitched in a wrapper, and forwarded with the Magazines.—Subscriptions for the Stamped Edition for the Continent, for not less than Three Months, and in advance, are received by M. Baudry, 3, Quai Malaquais, Paris, or at the Publishing Office, 14, Wellington-street North, Strand, London. For France and other Countries not requiring the postage to be paid in London, 28fr. or 1l. 2s. the year. To other Countries, the postage in addition.

[JAMES HOLMES, TOOK'S COURT, CHANCERY LANE.



UNIVERSITY COLLEGE, LONDON.—FACULTY of MEDICINE. SESSION 1850-51.

The CLASSES will COMMENCE on the 1st of OCTOBER, when Professor ERICHSEN will deliver an INTRODUCTORY LECTURE at 3 o'clock.

WINTER TERM.

Classes in the order in which Lectures are delivered during the day:—

ANATOMY and PHYSIOLOGY—Professor Sharpey, M.D.
CHEMISTRY—Professor Graham.
ANATOMY—Professor Ellis.
COMPARATIVE ANATOMY—Professor Grant, M.D.
SURGERY—Professor Erichsen.
MEDICINE—Professor Walshe, M.D.
PRACTICAL ANATOMY—The Pupils will be directed in their Studies during several hours daily by Professor Ellis and Mr. Briggs, Demonstrator.

SUMMER TERM.

BOTANY—Professor Lindley, Ph.D.
MIDWIFERY—Professor Murphy, M.D.
PATHOLOGICAL ANATOMY—Professor Jenner, M.D.
COMPARATIVE ANATOMY and ZOOLOGY—Professor Grant, M.D.
FORENSIC MEDICINE—Professor Carpenter, M.D.
PRACTICAL CHEMISTRY—Professor A. W. Williamson, Ph.D.
MATERIA MEDICA—Professor Garrod, M.D.
ANALYTICAL CHEMISTRY—Professor Williamson: throughout the Session.
NATURAL PHILOSOPHY, GEOLOGY, MINERALOGY—according to the announcement of the Faculty of Arts.

CLINICAL INSTRUCTION.

Hospital Practice daily throughout the Year.

Physicians—Dr. Walshe, Dr. Parkes, Dr. Garrod.
Assistant Physicians—Dr. Jenner, Dr. Hare.
Obstetric Physician—Dr. Murphy.
Surgeon—Mr. Quain, Mr. Erichsen.
Consulting Surgeon to the Eye Infirmary—Mr. Quain.
Ophthalmic Surgeon—Mr. Wharton Jones.
Assistant Surgeons—Mr. Marshall, Mr. Cadge.
Dental Surgeon—Mr. Durancé George.

MEDICAL CLINICAL LECTURES by Dr. Walshe and Dr. Garrod: also by Dr. Parkes, Professor of Clinical Medicine, whose special duty it is to train the pupils in the practical study of disease at the bedsides during the visits, and also by a series of Lessons and Examinations on the physical phenomena and diagnosis of disease to classes consisting of a limited number, and meeting at separate hours.

SURGICAL CLINICAL LECTURES, especially by Mr. Quain and by Mr. Erichsen.

Prosectorships may be obtained at the Office of the College.

Residence of Students.—Several of the Professors receive Students to reside with them; and in the Office of the College there is kept a register of parties unconnected with the College who receive Boarders into their families: among these are several Medical gentlemen. The register will afford information as to terms and other particulars.

THOMAS GRAHAM, Dean of the Faculty.
CHAS. C. ATKINSON, Secretary of the Council.

August, 1850.

The Lectures to the Classes of the Faculty of Arts commence on the 15th of OCTOBER.

The JUNIOR SCHOOL OPENS on the 24th of SEPTEMBER.

UNIVERSITY COLLEGE, LONDON.—FACULTY of ARTS and LAWS.—SESSION 1850-51.—The SESSION will COMMENCE on TUESDAY, OCTOBER 15, when Professor POTTER, A.M. will deliver an INTRODUCTORY LECTURE, at 3 o'clock precisely.

CLASSES.

LATIN—Professor Newman.
GREEK—Professor Malden, A.M.
HEBREW—Teacher, the Rev. D. W. Marks.
ENGLISH LANGUAGE and LITERATURE—Professor Scott, A.M.
FRENCH LANGUAGE and LITERATURE—Professor Merlet.
ITALIAN LANGUAGE and LITERATURE—Prof. Gallenga.
SPANISH—Teacher, Señor Gil de Tejada.
GERMAN LANGUAGE—Professor Heimann, Ph.D.
COMPARATIVE GRAMMAR—Professor Key, A.M.
MATHEMATICS—Professor De Morgan.
NATURAL PHILOSOPHY and ASTRONOMY—Professor Potter, A.M.
CHEMISTRY—Professor Graham.
PRACTICAL CHEMISTRY—Professor Williamson, Ph.D.
CIVIL ENGINEERING—Professor Harman Lewis, A.M.
MECHANICAL PRINCIPLES of ENGINEERING—Professor Eaton Hodgkinson.
MACHINERY—Professor Woodcroft.
ARCHITECTURE—Professor Donaldson, M.I.B.A.
DRAWING—Teacher, Mr. Moore.
GEOLOGY—Professor Ramsay, F.G.S.
MINERALOGY—Professor Chapman.
BOTANY—Professor Lindley, Ph.D.
ZOOLOGY (Recent and Fossil)—Professor Grant, M.D.
PHILOSOPHY of MIND and LOGIC—Professor the Rev. J. Hoppus, Ph.D.
ANCIENT and MODERN HISTORY—Professor Creasy, A.M.
LAW—(Vacant).
JURISPRUDENCE—Professor Foster, M.A. LL.D.
SCHOOLMASTERS' CLASSES—Professors Newman, Malden, De Morgan, and Potter.

Residence of Students.—Several of the Professors receive students to reside with them, and in the Office of the College there is kept a register of parties who receive Boarders into their families. The Registrar will afford information as to terms and other particulars.

Three Andrew Scholarships, one of 100l. and two of 50l. each, will be awarded to the three best proficients in Latin, Greek, Mathematics, and Natural Philosophy. Candidates must have been during the academical year immediately preceding students in the College or pupils in the School.

Prosectorships and further particulars may be obtained at the Office of the College.

HENRY MALDEN, A.M. Dean of the Faculty.
CHAS. C. ATKINSON, Secretary to the Council.

August, 1850.

The Session of the Faculty of Medicine commences on the 1st of OCTOBER.

The JUNIOR SCHOOL OPENS on the 24th of SEPTEMBER.

CIVIL ENGINEERING, ARCHITECTURE, and CONSTRUCTION.—The SESSION for the Department of CIVIL ENGINEERING, ARCHITECTURE, and MACHINERY, will COMMENCE on TUESDAY, the 15th of October.

This Department consists of the following Classes:—
MATHEMATICS—Professor De Morgan.
NATURAL PHILOSOPHY—Professor Potter, A.M.
CHEMISTRY—Professor Graham.
PRACTICAL CHEMISTRY—Professor Williamson, Ph.D.
CIVIL ENGINEERING—Professor Harman Lewis, A.M.
MECHANICAL PRINCIPLES of ENGINEERING—Professor Eaton Hodgkinson.
MACHINERY—Professor Bennet Woodcroft.
ARCHITECTURE and CONSTRUCTION—Professor Donaldson, M.I.B.A.
GEOLOGY—Professor Ramsay, F.G.S.
MINERALOGY—Professor Chapman.
DRAWING—Teacher, Mr. G. B. Moore.

Prospectuses and further particulars may be obtained at the Office of the College.

HENRY MALDEN, A.M. Dean of the Faculty of Arts and Laws.
CHAS. C. ATKINSON, Secretary to the Council.

University College, London, August, 1850.

PRACTICAL and ANALYTICAL CHEMISTRY.—BIRKBECK LABORATORY, University College, London.—Professor, A. W. WILLIAMSON, Ph.D.

Gentlemen desirous of engaging in chemical research, and students seeking instruction in elementary analysis, will find every requisite in this Laboratory, erected by the Council of the College for practical instruction in organic and general chemistry, and the principles of chemical research as applied more particularly to agriculture, medicine, and the manufacturing arts. The Laboratory is open daily from 9 A.M. to 4 P.M., except on Saturdays, when it is closed at 1 o'clock, from the 1st of October to the end of July. Students occupy themselves with pursuits of their own choice if sanctioned by the Professor, by whom they are assisted with needful instruction and advice.

Fees: Session, 2ol. 2s.; six months, 12l. 12s.; three months, 10l. 10s.; one month, 4l. 4s.

COURSE of GENERAL CHEMISTRY.—Professor Graham's Lectures are daily, except Saturday, from 2nd of October to 15th of April, at 11 A.M. Fee for perpetual admission, 9l.; whole term, 6l.; half term, 3l.

A Prospectus with full details may be had at the Office of the College.

HENRY MALDEN, A.M. Dean of the Faculty of Arts.
THOMAS GRAHAM, Dean of the Faculty of Medicine.
CHAS. C. ATKINSON, Secretary to the Council.

August, 1850.

UNIVERSITY COLLEGE, LONDON.—JUNIOR SCHOOL, under the government of the Council of the College.

HEAD MASTER—THOMAS HEWITT KEY, A.M.

The SCHOOL will OPEN on TUESDAY, the 24th of SEPTEMBER. The Session is divided into three Terms, viz., from the 24th of September to Christmas, from Christmas to Easter, and from Easter to the 1st of August.

The yearly payment for each pupil is 18l., of which 6l. are paid in advance in each Term. The hours of attendance are from a quarter-past 9 to three-quarters past 3 o'clock.

The afternoons of Wednesday and Saturday are devoted exclusively to Drawing.

The subjects taught are Reading, Writing, the English, Latin, Greek, French, and German Languages, Ancient and English History, Geography (both Physical and Political), Arithmetic and Bookkeeping, the Elements of Mathematics and of Natural Philosophy, and Drawing.

Any pupil may omit Greek, or Greek and Latin, and devote his whole attention to the other branches of education.

There is a general examination of pupils at the end of the Session, and the Prizes are then given.

The discipline of the School is maintained without corporal punishment.

A monthly report of the conduct of each pupil is sent to his parents or guardian.

Further particulars may be obtained at the Office of the College.

CHAS. C. ATKINSON, Secretary to the Council.

The College Lectures in the Classes of the Faculty of Medicine commence on the 1st of October; those of the Faculty of Arts on the 15th of October.

August, 1850.

UNIVERSITY-HALL, Gordon-square, is open as an Academical Residence for Students of University College. Principal and Classical Tutor, A. H. CLOUGH, M.A., late Fellow and Tutor of Oriel College, Oxford; Vice-Principal and Mathematical Tutor, R. H. HUTTON, M.A., Fellow of University College. Information may be had at the Hall, or from the Rev. D. DAVISON, 16, Frederick-street, Gray's Inn-road.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

NOTICE is hereby given, that CANDIDATES for the FELLOWSHIP, required by the Bye Laws to produce the Certificate or Certificates of the Examiners, appointed by the Council, of having undergone Examinations in the Greek, Latin, and French Languages, and in the Elements of Mathematics, be allowed to present themselves for such Examinations at any period after they shall have attained the age of eighteen years, and upon the payment of Ten guineas, which sum shall be allowed in the fee payable upon admission to the Fellowship.

The next Examinations in these subjects will take place in the first week of November next.

August 9, 1850. EDMUND BELFOUR, Secretary.

ROYAL AGRICULTURAL COLLEGE, CIRENCESTER.

The SUMMER SESSION will commence on SATURDAY, the 17th of AUGUST, 1850. All *new Students* are required to attend for examination on the *preceding day*.

Those who purpose *entering as Students* for the ensuing Session are requested to *apply* (either by letter or personally) *to the Principal* at the College, Cirencester, Gloucestershire, for the necessary *Admission Papers*. PHILIP BOWES, Secretary.

London Office,
26, King William-street, West Strand.

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ACCOUNTS.—A Gentleman, experienced in ACCOUNTS, is open to an ENGAGEMENT for two hours daily, to keep (or adjust) Accounts. Terms One Guinea per week. N.B. The Advertiser is conversant with BANKING and INSURANCE Accounts.—Address, pre-paid, to F. P., care of Mr. Straker, Bookseller, 3, Adelaide-street, West Strand.

MEDICAL PUPIL.—DR. NEVINS, Liverpool, Surgeon to the West Derby Union Hospital, Lecturer on Chemistry in the Collegiate Institution, and on Botany in the Medical School, has a VACANCY FOR A PUPIL. Dr. Nevins was for some years engaged as Medical Tutor at Guy's Hospital in preparing Students for Examination by the University of London and the other Examining bodies, and his Pupils have the advantage of his Hospital, and an extensive Chemical Laboratory, and of attending the Medical School.

33, Clarence-street, Liverpool.

PLESIOSAURUS DOLICHODEIRUS.—Mr. TENNANT, Geologist, 149, Strand, London, can supply Collectors with a fine Cast of this interesting Fossil,—the original is described by Dr. Buckland in his 'Bridgewater Treatise,' and figured in vol. 2, plate 17. The Cast is in Plaster, carefully coloured and mounted in wood frame, 6 feet 3 inches long, by 3 feet 4 inches wide, price 4l. 4s. Mr. Tennant has Casts of various Teeth and Bones of the Iguanodon, Hylæosaurus, &c. described by Dr. Mantell, Prof. Owen, and others; Geological Models in Wood, constructed by T. Sopwith, Esq. F.R.S., to illustrate the nature of Stratification; Faults, Veins, &c. in sets, from 2l. to 5l.; also Elementary Collections for Students in Geology, from Two to Fifty Guineas each.

GEOLOGICAL TRANSACTIONS.—Mr. TENNANT, Geologist, 149, Strand, London, can supply the last five volumes, in twelve parts, being Volumes 3, 4, 5, 6 and 7, for 5l., published at 17l. They contain numerous Plates of Fossils, Sections, and Maps to illustrate the original memoirs by the following distinguished Geologists,—Buckland, Buddle, Clarke, Clift, Darwin, De la Beche, Egerton, Fitton, Hamilton, Lonsdale, Lyell, Mantell, Murchison, Owen, Sedgwick, Strickland, Taylor, Weaver and others.—Mr. T. has a few copies of Mr. Hawkins's 'Book of the Great Sea Dragons,' with thirty beautiful plates, 21 inches long by 14 wide, of the remains of the Ichthyosauri and Plesiosauri from the Lias, price 21s., published at 30s.

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## SOCIETY OF ARTS.—SPECIAL PRIZE-LIST for 1850 and 1851.

The intimate connexion of the Society of Arts with the Exhibition of the Works of Industry of all Nations in 1851, which is a subject of congratulation to the Members of the Society, as the successful enlargement of an idea the Society has long aimed to realise, has appeared to the Council to render altogether superfluous any attempt on the part of the Society to pursue its ordinary course for the encouragement of Arts, Manufactures and Commerce by the offer of its usual Prizes for the Session of 1850 and 1851.

The Council have therefore considered how they might most usefully apply that portion of the revenue of the Society to the particular circumstances of the year.

The Council are of opinion that the most useful work they can undertake, and one they believe to be strictly auxiliary to the views of their Royal President, H.R.H. the Prince ALBERT, and of Her Majesty's Commissioners for the Exhibition, will be to encourage the production of philosophical Treatises on the various departments of the Exhibition, which shall set forth the peculiar advantages to be derived from each to the Arts, Manufactures, and Commerce of the country.

The Council accordingly offer, in the name of the Society, the large Medal and twenty five pounds for the best, and the Society's small Medal and ten pounds for the second best Treatise on the objects exhibited in the section of Raw Materials and Produce.

A large Medal and twenty-five pounds for the best, and a small Medal and ten pounds for the second best Treatise on the objects exhibited in the section of Machinery.

A large Medal and twenty-five pounds for the best, and a small Medal and ten pounds for the second best Treatise on the objects exhibited in the section of Manufactures.

A large Medal and twenty-five pounds for the best, and a small Medal and ten pounds for the second best Treatise on the objects exhibited in the section of Fine Arts.

Each Treatise must occupy, and not exceed, eighty pages of the size of the Bridgewater Treatises.

The Society will also award its large Medal and twenty-five guineas for the best general Treatise upon the Exhibition treated commercially, politically, and statistically; and small medals for the best treatises on any special object or class of objects exhibited.

The Treatises for which rewards are given are to be the property of the Society; and if deemed suitable for publication, should the Council see fit, they will cause the same to be printed and published, and will award to the author the net amount of any profits which may arise from the publication after the payment of the expenses.

The Treatises to be delivered at the Society's House on or before the 30th of June, 1851.

In announcing this List, there is no intention on the part of the Council to confine the rewards of the Society to the subjects named there, though, for the reasons given, they do not anticipate that communications of interest on other subjects will be submitted.

GEORGE GROVE, Secretary.

18, John-street, Adelphi, August 8, 1850.

## PUTNEY COLLEGE, near London.

*President.*

His Grace the DUKE of BUCCLEUCH, K.G.

*Principal*—The Rev. M. COWIE, M.A., late Fellow of St. John's College, Cambridge.

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| | | |
|---|---|---|
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| | Mineralogy and Geology | Professor Ansted, F.R.S. |
| | Metallurgy | Dr. Frankland. |
| | Surveying, Field Engineering and Nautical Astronomy | C. Hodgkinson, Esq. |
| | Civil Engineering and Architecture | S. Clegg, jun. Esq. |
| | Machinery | W. Binns, Esq. |
| In the Military Department | Military Science | Captain Griffiths, R.F.P. Royal Artillery. |
| | Drawing | H. Fradelle, Esq. |
| | Hindustani | F. Falconer, Esq. |
| | Sword Exercise and Fencing | Messrs. Angelo. |
| In the University Department | Divinity, Special Course | The Rev. M. Cowie, M.A. Principal. |
| | Mathematics, ditto | The Rev. W. G. Watson, M.A. Vice-Principal. |
| | Classics, ditto | H. M. Jeffery, Esq. B.A. Assistant Tutor. |

The fees for the additional courses in these three departments are so arranged that the cost of education, board, &c. need not exceed 100 guineas per annum.

Prospectuses may be had at Mr. Dalton's, 23, Cockspur-street, Charing-cross; Messrs. Smith, Elder & Co.'s, Cornhill; or any information can be obtained by application to the Principal, at the College.

## FREDERIC REEVE, PRINTER and LITHOGRAPHER, executes every description of work connected with Letterpress and Lithography in the best style and at moderate charges. Illustrations of subjects in Natural History, Geology, Anatomy, Engineering, Architecture, &c., lithographed from nature or from drawings by Artists conversant with the various branches of science, and printed in black or colours. Landscapes, Views, Portraits, &c., completed for publication with artistic correctness from sketches however imperfect, and printed with one or more tints. Microscopic details, Maps, Plans, Sections, Writings, &c., engraved on Stone according to the method adopted in Germany, and printed with an effect little inferior to Steel.

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## Sales by Auction.

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MR. L. A. LEWIS will SELL, at his House, 125, Fleet-street, on TUESDAY, August 20, and three following days, A MISCELLANEOUS COLLECTION of BOOKS, including Rees's Cyclopædia, 85 parts, large paper, complete—Adelung's German Dictionary, 4 vols.—Universal History, 20 vols.—Anquetil, Histoire de France, 4 vols.—Russell's Ancient and Modern Europe, 10 vols.—Ticknor's History of Spanish Literature, 3 vols.—Waverley Novels, 25 vols.—Catholic Theology—Classics, &c., also a Collection of English and Foreign Engravings, &c.

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MESSRS. S. LEIGH SOTHEBY & CO., Auctioneers of Literary Property and Works Illustrative of the Fine Arts, will SELL by AUCTION, at their House, 3, Wellington-street, Strand, on WEDNESDAY, August 21, and following day, at 1 precisely, a Rare, Interesting and Valuable COLLECTION of WORKS chiefly relating to the history of America, including the productions of Las Casas, Cortes, Hernandes, Hakluyt, and an early edition of the celebrated Letter of Columbus; also some curious Books relating to the Brownists and Quakers, Early Voyages and Travels, Interesting Discoveries and Missionary Accounts, some rare Chronicles, royal and other Autograph Letters, and Engraved Portraits, illustrating the Discovery and Early History of America.

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PUTTICK & SIMPSON, Auctioneers of Literary Property, will SELL by AUCTION, at their Great Room, 191, Piccadilly, on WEDNESDAY, August 21, the FINAL PORTION of Mr. JAMES CARPENTER'S VALUABLE STOCK, consisting of BOOKS in quires and bound, including British Poets, 100 vols. proof plates—Reynolds's Discourses, 15 copies—Serie degli Uomini i più illustri, 14 vols. 300 Portraits—Hamilton's Memoirs of Grammont, 2 vols. 9 sets, all proofs—Bryan's Dictionary of Painters, by Stanley, 14 copies—R. P. Bonington's Works, 34 copies, mostly proofs; and other useful Remainders of BOOKS and PRINTS, including the well-known Portraits of T. Moore, J. Constable, R. P. Bonington, with the remaining Stock of his 'Fish Market,' mostly proofs—a remainder of Bewick's Works in Natural History, including a hitherto unknown Print of 'The Chillingham Bull,' &c. May be viewed the day before the Sale. Catalogues will be sent on application.

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LONDON, SATURDAY, AUGUST 17, 1850.

## REVIEWS

*Memoirs of the Life and Writings of Thomas Chalmers, D.D., L.L.D.* By his Son-in-Law, the Rev. William Hanna, L.L.D. Vol. II. Edinburgh, Sutherland & Knox; London, Hamilton & Co.

In the first volume of this biography [*Athen.* No. 1155] Dr. Hanna allowed us very clearly to see in what manner it was his intention to treat his subject. We differ from him in principle,—not recognizing as a canon that the spirituality of a biographer's subject excludes its humanity; and that in tracing the life of a great theologian, preacher, or philanthropist the man is to be left out as much as if he had never existed. Had Dr. Chalmers ranked among the quietists, it is true, in whose creed the more complete the self-effacement the more complete was the Christianity, such a monochromatic portraiture might have been natural and inevitable. But this was not his "favour." Even by what is here charily shown to us, we perceive him to have been an earnest individual, sometimes an angry man—as independent a churchman as he was an enthusiastic preacher—resolute in asserting his predominance over, not his submission to, his congregation, and in maintaining his right to leisure and free action. He knew that he was born for occupations better than little official solemnities, or even than such social intercourse as, under pretext of "taking counsel," is virtually nothing better than gossipry and dissipation, if dissipation be waste of time. He had scarcely settled himself in Glasgow before we find him energetically dealing with its difficulties as follows.—

"This, Sir, is a wonderful place; and I am half entertained and half provoked by some of the peculiarities of its people. The peculiarity which bears hardest upon me is the incessant demand they have upon all occasions for the personal attendance of the ministers. They must have four to every funeral, or they do not think that it has been genteelly gone through. They must have one or more to all the committees of all the societies. They must fall in at every procession. They must attend examinations innumerable, and eat of the dinners consequent upon these examinations. They have a niche assigned them in almost every public doing, and that niche must be filled up by them, or the doing loses all its solemnity in the eyes of the public. There seems to be a superstitious charm in the very sight of them; and such is the manifold officiality with which they are covered, that they must be paraded among all the meetings and all the institutions. I gave in to all this at first, but I am beginning to keep a suspicious eye upon these repeated demands ever since I sat nearly an hour in grave deliberation with a number of others upon a subject connected with the property of a corporation, and that subject was a *gutter*, and the question was whether it should be bought and covered up, or let alone and left to lie open. I am gradually separating myself from all this trash, and long to establish it as a doctrine that the life of a town minister should be what the life of a country minister might be, that is, a life of intellectual leisure, with the *otium* of literary pursuits, and his entire time disposable to the purposes to which the Apostles gave themselves wholly, that is, the ministry of the word and prayer."

Nor did the above expression of resolute disapprobation confine itself to the reverend correspondent to whom it was addressed. So intolerable and hampering did Dr. Chalmers find the interruptions to which he was exposed, and the secondary tasks in which he was expected to figure, if not to act,—that some twelve months after he had taken up his permanent residence in St. Mungo's capital, he fairly got up in the Tron pulpit one Sunday morning to preach this Hydra of oppression down.—

"The forenoon discourse was devoted to a minute and most singular detail of the multiform exactions and services by which the ministers of the Gospel in Glasgow had been withdrawn from prayer and the ministry of the word. He told his wondering audience of schedules, and circulars, and printed forms, with long blank spaces which the minister should have the goodness to fill up, and how of all his doings in this one department the simple achievement of seventy signatures in a day was all that his dizzy recollection had been able to retain. Pursuing the strange narration, in which pathos, and satire, and burning indignation were all blended, 'I have already said much,' he continued, 'of the interruption and the labour which the public charities of the place bring along with them; and yet I have not told you one-half the amount of it. I have only insisted on that part of it which takes a minister from his house, and from which the minister, at the expense of a little odium, can at all times protect himself, by the determined habit of sitting immovable under every call and every application. All that arrangement which takes a minister away from his house may be evaded—but how shall he be able to extricate himself from the besetting inconveniences of such an arrangement as gives to the whole population of a neighbourhood a constant and ever-moving tendency towards the house of the minister? The patronage with which I think it is his heavy misfortune to be encumbered, gives him a share in the disposal of innumerable vacancies, and each vacancy gives rise to innumerable candidates, and each candidate is sure to strengthen his chance for success by stirring up a whole round of acquaintances, who, in the various forms of written and of personal entreaty, discharge their wishes on the minister in the shape of innumerable applications. It is fair to observe, however, that the turmoil of all this electioneering has its times and its seasons. It does not keep by one in the form of a steady monsoon. It comes upon him more in the resemblance of a hurricane; and like the hurricanes of the atmosphere, it has its months of violence and its intervals of periodical cessation. I shall only say, that when it does come, the power of contemplation takes to herself wings and flees away. She cannot live and flourish in the whirlwind of all that noise and confusion by which her retreat is so boisterously agitated. She sickens and grows pale at every quivering of the household bell, and at every volley at the household door, by which the loud notes of impatience march along the passages, and force an impetuous announcement into every chamber of the dwelling-place. She finds all this to be too much for her. These rude and incessant visitations fatigue and exhaust her, and at length banish her entirely; nor will she suffer either force or flattery to detain her in a mansion invaded by the din of such turbulent and uncongenial elements. But though I talk of cessations and intervals, you are not to suppose that there are ever at any time the intervals of absolute repose. There is a daily visitation, though it is only at particular months that it comes upon you with the vehemence and force of a tornado. There was of late an uncensing stream of people passing every day through the house, and coming under the review of the minister on their road to the supplies of ordinary pauperism. This formed part of the prescribed conveyance through which each of them trusted to find their way to the relief they aspire after. This always secured a levee of petitioners, and kept up a perennial flow of applications, varying in rapidity and fulness with the difficulty of the times—but never, in the whole course of my experience, subsiding into a rill so gentle that it only ministered delight and refreshment to the bosom by the peacefulness of its murmurs. Oh, no! my brethren—there is a something here about which our tearful sons and daughters of poesy are most miserably in the wrong. I know that they have got many fine things to say about the minister of a beneficent religion having a ready tear for every suffering, and an open ear for every cry, and room in his house for every complainer, and room in his heart for a distinct exercise of compassion on the needs and the distresses of every afflicted family, and an open door through which the representations of dejected humanity may ever find a welcome admittance, and a free unoccupied day throughout every hour of which it is his part to act the willing friend of his parishioners, and to yield the alacrity of his immediate attentions in behalf of all the wants and all the wretchedness that is among them. Yes! all this ought to be done, and agents should be found for the doing it. But the minister is not the man who can do it. The minister is not the man who should do it. And beset as we are on the one hand by a hard and a secular generation, who, without one sigh of remorse, could see every minister of the city sinking the spiritualities of his office under the weight of engagements which they themselves will not touch with one of their fingers; and deafened as we are on the other hand by the outcry of puling sentimentalists, who, without thought and without calculation, would realise all the folly and all the fondness of their fancy-sketches upon us, I utterly refuse the propriety of all these services—and yet proclaiming myself the firm, the ardent, the devoted friend of the poor, do I assert these advocates of theirs to be the blind supporters of a system which has aggravated both the moral and the physical wretchedness of a most cruelly neglected population.'"

What the Doctor began in the morning he continued at afternoon service:—to the no small amazement, we should imagine, of his hearers. How Dr. Chalmers succeeded in establishing his point and working out his purposes, (never, we suspect, with the entirely acquiescent sympathy of the overruled Glaswegians,) cannot here be followed; but the above passage is too characteristic to be passed over, in its earnest fervour, its eloquence, its straightforward self-assertion of the rights as well as the duties of the preacher.—In truth, while we can never forget the claims and services of Dr. Chalmers as a philanthropist, and can still less overlook his powers as a writer—which were brilliant enough to keep Hazlitt for a whole morning thralled under an apple-tree by "the Astronomical Sermons,"—it is as an orator that this book most clearly and forcibly presents him to us. Whether by design or not, Dr. Hanna most clearly exhibits the oracle, to hear whose discourse lay broadcloth was rent, dowagers of quality were smuggled in across unsafe planks into chapel windows, and "reserved benches" were charged and taken possession of by excited crowds, weary of pressure and resolute to "sit and be wrung." In such a celebrity as this, whether it belong to a Dean Kirwan who can preach the watches of his congregation into the collection-plate, or to an Irving who terrifies the *Lord Georges* and *Lady Celestinas* of Almack's by threatening them with more fiery dances elsewhere,—there may be more of what is fascinating than of what is profitable to either priest or people. When Wilberforce diarized that the world was "wild about Dr. Chalmers," he little thought how closely the spirit of his entry approached the enthusiasm of those who

worshipped Catalani's pantaloons

at public places of secular performance.—We have never, however, met with any one better calculated to brave the storms of success raised by himself than Dr. Chalmers as here described. Know his power he certainly did; but he seems to have acted on the knowledge with a manly absence of mock humility—an honest consciousness of its importance, and of his duty to nourish it by private study and meditation. Many of the fevers, most of the failures, of his class appear to have been spared him. Others may have been more suave and amiable; but he was strong, like a steward intent on his stewardship, who feels that he has small time and less patience for the bandying of courtesies on insignificant subjects. Such is the impression which Dr. Hanna's portraiture of him makes on us.

We may here introduce three characteristic anecdotes which have reference to this period of Dr. Chalmers's life,—and which in some measure illustrate our remarks. It appears that at first his Scottish congregations were not

altogether satisfied at the form of his delivery. On one occasion, says Dr. Hanna,—

"The wind interfered with the preacher's *reading*, as well as the people's hearing. He had much difficulty with his manuscript; and I believe that it was upon this occasion that one portion of it escaped from his hands altogether—the people making great efforts to recover it, and the preacher assuring them that it was of no consequence, as nobody could make any use of it but himself. It had been written, in fact, in short-hand. His power of reading so fluently from this kind of manuscript has often surprised even the most expert stenographers; but from all kinds of manuscript his mode of reading was unique,—so entirely peculiar as to prevent his example being turned into an argument or precedent upon the general question as to how sermons should be delivered. He was himself greatly amused by the manner in which this peculiarity of his had once been described. After dinner one day, at his friend Mr. Bruce's, the conversation happened to turn on the prevalent intense dislike of our common people to the reading of sermons, or what they call the *paper*. One of the company remarked, that if ministers who read would but do it with more spirit, the popular prejudice would ere long disappear, adding that she knew of a country wife who, in spite of her great general abhorrence of the 'paper,' was much attached to the preaching of a 'paper minister,' and who, on this strange inconsistency being remarked upon, replied in her own defence—'Ay, very true; but then he has a *pith* wi' his paper.'—'That reminds me,' said Dr. Chalmers, 'of an old anecdote of myself. A friend of mine expressing his surprise to a country woman in Fife, that she who so hated reading should yet be so fond of Mr. Chalmers, she replied, with a serious shake of the head,—'Nae doubt; but its *fell readin' thon*.'"

The following, too, is characteristic.—

"While Dr. Chalmers was very busily engaged one forenoon in his study, a man entered, who at once propitiated him, under the provocation of an unexpected interruption, by telling him that he called under great distress of mind. 'Sit down, Sir; be good enough to be seated,' said Dr. Chalmers, turning eagerly and full of interest from his writing-table. The visitor explained to him that he was troubled with doubts about the Divine origin of the Christian religion; and being kindly questioned as to what these were, he gave among others what is said in the Bible about Melchisedek being without father and without mother, &c. Patiently and anxiously Dr. Chalmers sought to clear away each successive difficulty as it was stated. Expressing himself as if greatly relieved in mind, and imagining that he had gained his end—'Doctor,' said the visitor, 'I am in great want of a little money at present, and perhaps you could help me in that way.' At once the object of his visit was seen. A perfect tornado of indignation burst upon the deceiver, driving him in very quick retreat from the study to the street door, these words escaping among others,—'Not a penny, Sir! not a penny! It's too bad! it's too bad! And to haul in your hypocrisy upon the shoulders of Melchisedek!'"

How many a burden of hypocrisy have these same "shoulders of Melchisedek" been called on to bear!—Our next and last extract is more whimsical in its rueful way.—

"Scarborough was the chief favourite, scarcely a Sabbath passing in which the precentor did not get specific instructions to close the service by singing it; and they were once opened by it in St. John's in rather a singular manner. A half-witted woman, who was a most faithful attendant on Dr. Chalmers's ministry, seized the opportunity, and as soon as the first line of the psalm had been given out from the pulpit, struck up the favourite tune. The precentor had no time given him to interfere, and so well and so powerfully was his office performed for him that he wisely let her singing stand for his own, and struck in at the second line of the psalm. This woman's extreme love for the ministry turned at last into an extreme love for the person of Dr. Chalmers, a love which became with her an absorbing passion. She firmly believed it to be returned. 'Mrs. Chalmers folks said was his wife, but she kent better, and so did the Doctor himsel'.' At first she had been perfectly harmless, and had been freely admitted to the church; but now persecuted by all kinds of strange attentions from her, and alarmed as to what her singular passion for him might tempt her to do, Dr. Chalmers was seized with a nervous terror of her. One Sabbath, when the church was very crowded, she had got up to the top step of the pulpit stair. Dr. Chalmers entered the pulpit without noticing her, but on turning round there she was by his side. 'John,' said he to the beadle, shrinking back to the furthest side of the pulpit in extreme terror—'John, I must be delivered conclusively from that woman.' She was now forbid access to the church, as the very sight of her disturbed him. Nevertheless, she faithfully attended in Macfarlane Street, and when she could not get near to him she would stand wiping with her handkerchief the froth off the mouth of the horse which had carried him to church. At one time she was seized with the dread that he did not get enough to eat at home. Coming upon him once unexpectedly at the corner of the street, 'Come, Doctor, do come, and get a plate of parritch; I hae fine meal the noo.' As he would not take the food that she thought so necessary at her house, she resolved to carry it to his own. One evening, at Kensington Place, the servant, on opening the door, was surprised by a large round bundle, covered with a red handkerchief, being thrown into the lobby. On unwrapping it it was found to contain oat cakes and sheep's trotters, for the special sustentation of the minister. On his return to Glasgow, a year after going to St. Andrews, he entered the house of one of his elders in great agitation. 'Mr. Thompson,' he said, 'that daft woman is in pursuit of me. Can you not carry me to my brother's by some way that she cannot track our path?' Mr. Thompson undertook and executed the commission; but they had not been long gone when she appeared at the door with a large jug of curds and cream, nor would she be satisfied till Mrs. Thompson had taken her through all the rooms of the house to convince her that Dr. Chalmers was not there."

We should be ill satisfied with ourselves could any reader imagine from the above remarks that we hold Dr. Chalmers to have been one of those exhibitors who take out the full amount of their public virtue in the private licences of arrogance, bad temper, and domestic neglect. He appears to have been respectively dutiful, confidential, and kind (if not indulgent) in his domestic relations,—to have been loved as well as looked up to,—to have borne with a truly Christian tolerance differences from himself in his nearest kindred which in form were almost offensive. It is the mixture of strength with excitability which principally strikes us in looking at the sketch here presented; but neither the vigour nor the enthusiasm appears to have excluded the love and the duty which give a beauty and a balance to the homely passages of everyday life and action.—This second volume closes with the removal of Dr. Chalmers from Glasgow to St. Andrews, on his being elected to the chair of Moral Philosophy in St. Rule's University.

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*Young Italy.* By Alexander Baillie Cochrane, M.P. Parker.

THE reason why this volume—bound in virgin white—is called 'Young Italy,' seems to be, partly because the author delights to remind his readers that he is a member of that "oldest juvenile house" in the kingdom, Young England,—partly because the subjects chiefly discussed in it are the state and prospects of Italy at the present moment, while so many seeds are there germinating. Of the thirteen papers and sketches, however, of which the book consists, three or four have no bearing whatever on present affairs, and appear to have been added merely for the purpose of filling up. Of the remaining papers, the most interesting are those on 'The History of the Roman Republic,' on 'The Temporal and Spiritual Authority of the Pope,' on 'The Murder of Rossi,' on 'The Prisons of Naples,' and on 'The Pope's Return to Rome.'

These papers may be regarded as an exposition of Mr. Cochrane's—and generally also, we should suppose, of Young England's—views on the present state of Italian politics. Their gist may be thus summed up. Mazzini and the Italian Revolutionists are a set of firebrands and fanatics, backed by all that is loose and worthless in Italy; Austrian rule is mild, admirable and beneficial, and is extremely popular in Lombardy; the attempt of Carlo Alberto was a mad folly, stimulated by false hopes of English assistance; the policy of England in Italian affairs as represented in the persons of Lords Palmerston and Minto has been throughout wretched and degrading—in short, an encouragement of Revolution; the Pope, a good sort of man, was gulled into measures of reform, but has probably now regained his senses, and will act with more discretion; and the much-abused King of Naples is in reality a very honourable and well-meaning prince, whose only fault is that he allows his prisons to be fuller of political prisoners, and worse kept than might be desirable.—An extract or two will convey Mr. Cochrane's notions more precisely.

The recent movement in Piedmont, Mr. Cochrane thinks, has ruined the character of the people in that part of Italy.—

"It has entirely revolutionized the people, who are now never satisfied unless daily concessions are made to them. In point of fact, Victor Emanuel is allowed to possess the crown and a sufficient civil list, on condition that he will adopt all the schemes and views of the Utopian financial reformers. Piedmont at the present moment is to all intents and purposes a republic, with a timid sovereign at the head: he can originate nothing and refuse nothing; his throne entirely depends on his subserviency to the popular party. A stranger, on arriving at Turin is surprised to find in a city full of palaces, and where royal carriages with scarlet liveries and royal trappings are flitting by him at every corner, that the people are as insolent in their demeanour, as they could have been in the days of the great Republic, one and indivisible. In the cafés the waiters will sit down at the same table, take the paper out of your hands, and smile contemptuously at any expression of indignation called forth by such lapses of social etiquette. As for the cafés, they have assumed names adapted to the present order of times, but the signs have been selected without much regard to the truth of their signification: thus, we have Café dell' Independenza d' Italia, Café dell' Unita d' Italia, Café della Speranza d'Italia: there being no Italian independence, no Italian unity, and, we are compelled to add, little Italian hope, which can in any way be justified."

The following is Mr. Cochrane's romantic story (authority not given) of a meeting of the conspirators for the murder of Rossi, the night before that atrocious affair took place.—

"On the night of the 14th of November, in one of the lowest and least frequented quarters of Rome, at an hour when the streets were quite deserted, men, evidently bent on some sinister and dangerous design, from the caution with which they walked and the timid glances which they cast around them, were seen to approach the door of one of those half-decayed, black-looking buildings which seem the natural abodes of low, reeking vice, and foul conspiracy. Sometimes these men came alone—at others, in groups of two or three; but all, before they attempted to open the door, gave a significant tap at the shutter, when a low bell was heard, the latch of the door was raised, and the conspirators—for no one can doubt the character and purpose of these men—were shown into a small room, where many others, all disguised alike, with slouched hats and large cloaks were collected. A most mysterious silence was preserved; but when the number, thirty-six, was completed, the names, written on separate pieces of paper, were thrown into a hat, and drawn out by lot, and each man held his breath while he examined the slip of paper which was to decide his fate and that of

the great minister. This fearful lottery ended, one of the leaders showed them into another room, where, to the ill-suppressed horror of the less daring, a corpse was lying, with the damps of death still clinging to the brow. One of the heartless assassins, well skilled in surgery, took a knife, and pointed to the precise spot in the neck where a vital blow might be struck with instantaneous effect. The selected murderer, recoiling, not from horror of the crime, but from terror at the revolting spectacle of this body, newly dead, exposed to view in the dimness of the night, with the pale light flickering over the pale countenance, was dragged to the table—his finger was guided by the more experienced hand to the vital part—the exact place in which he was to stand in relation to his victim, was shown him—those who were to group themselves in his more immediate vicinity, and to divert his attention, were selected. Never was murder rehearsed for the stage with a more perfect composure."

Mr. Cochrane cannot contain himself when he names the Triumvirate, and describes the state of Rome under their Government; but bursts forth as follows.—

"On the 30th of March, the famous triumvirate consisting of Mazzini, Armellini, and Saffi, was named. Mazzini having arrived at Rome on the 8th of March. A system of wanton spoliation, of unbridled excess, of cruelty, perhaps without parallel, commenced. It is true, that the guillotine was not erected in the public places; there was no Place de Grêve, no Abbaye, or Carmes. No prison vomited forth every morning tumbrils of miserable victims, devoted to the scaffold. But those human tigers of the French Revolution, were they much worse than the base fainéans who now assumed the authority of the papal purple—men whose ambition appeared to grow with the weakness of their capacity—men who throughout never performed a great action, or pronounced a great word—men to be classed amongst those who—

Are willing to wound, but yet afraid to strike—

who, when they did strike, invariably did so under a cloak, and persecuted not indeed in the name of the Goddess of Reason, but in the name of the Deity."

Really Mr. Cochrane would seem to make a charge against these revolutionists of the absence of the ordinary revolutionary crimes!

Mr. Cochrane visited the prisons of Naples; and had afterwards an interview with the King,—which and its results he thus describes.—

"When I had the honour of seeing him, he at once came to the point by remarking, that I had discovered the injustice of the accusations brought against him, for I had not found fifteen thousand prisoners. 'True, sir,' I answered, 'but I found six hundred and fourteen; and, permit me to say, it is six hundred and fourteen too many.'—'How is this?' said his majesty; 'we have not had one execution for political offences!'—I took the liberty of suggesting, that, to many people, years of imprisonment is even a greater evil than death; that, at any rate, the state of the prisons, and the mixture of all classes of prisoners, could never be justified. I took the liberty of observing, that, as his majesty had been the first of sovereigns to arrest the republican movement, so he should be the first to pardon its excesses; that no constitutional party in Europe could support the principle of imprisoning men without any pretence at a trial, and sometimes on the most unfounded accusations; that it was unworthy of a government to lend itself to petitions against the constitution, which the King had sworn to maintain. Nothing could be more noble, more generous, more sensible than the king's language. * * I do but justice to the King's character in mentioning, that when, on leaving, I expressed my acknowledgments to him for his condescension, and apologized for the frankness with which I had spoken, he said, 'I am delighted to have heard the truth—I wish to hear it; no one is more anxious than I am, to do what is right. I have been shamefully traduced and calumniated—most unjustly so; but you have spoken from your heart bravely and honourably, and I thank you for it!' The result of this interview was, that in a few days the political prisoners were separated from the general mass. Some few, I believe, were released; and an article appeared by government authority, severely blaming the petitions which were signing against the constitution. So far so well; but to my very deep regret, I have heard from Naples that the political prisoners have been only removed to a much worse place, that their communications with their families have been more restricted; that the few who were released were men quite unimportant, and would have been discharged at any rate; and what does give countenance to several other reports is, that within the last few weeks, I see by the papers that the constitution has been virtually abolished."

These extracts show the spirit of the book. Its sentiments are pretty enough,—reminding the reader of white waistcoats and white kid gloves. The thought wherewith these sentiments are endowed may be appraised at the smallest circulating literary coin.

The only practical suggestion of a political kind with reference to Italy contained in the volumes is, that it might be well for Italy if either, on the one hand, the temporal sovereignty of the Pope were entirely destroyed, the Papal dominions being put civilly under the rule of Austria, or of Naples, or of both, and the Pope being left a purely spiritual monarch with a certain fixed income,—or if, on the other hand, according to the recommendation in Lord Mount-Edgecumbe's pamphlet, the temporal government of the Pope were contracted to the mere limits of a municipality manageable by a police force, the remainder being distributed between Naples and Tuscany.

Mr. Cochrane's volume is, we have hinted, very agreeably written:—but there are some curious literary peculiarities in it. It is the author's habit, for example, to weave his quotations from the French and Latin into his text in an abrupt manner and with no distinction of type,—as if he meant to say to his reader "Really, sir, Latin and French come so easily to me, that I don't know when I write them."—Occasionally, too, there are a clumsiness of expression and a mixture of metaphor:—as when the writer calls Switzerland "the rusty hinge of European diplomacy, the spoiled offspring of diplomatic necessities, the Mecca of all political refugees, the asylum for broken-down statesmen." There are other minor errors,—which we do not particularize, because there seems a possibility that they may be the printer's.

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*Junius.* By John Wade. Vol. II. Containing the Private and Miscellaneous Letters, and a New Essay on the Authorship. Bohn.

Mr. Wade has had the modesty and good sense to eat his leek and hold his tongue; and we are therefore saved from the necessity of entering into any elaborate criticism on the demerits of this the concluding volume. He says—what we should never have suspected—that "the labour and anxiety bestowed on the present volume have been very considerable;"—which, however, may be true, for it depends on the amount of knowledge that he possessed when he entered on the duties of his office. He certainly appears to have sought for information—from others; we wish he had hunted a little more diligently himself. The commonest sources of information have not been consulted,—the slightest examination has not been made. He has not even compared Good's edition of the Miscellaneous Letters with the originals in the *Public Advertiser*, but has reproduced them with all their errors, even the typographical:—nor has he compared one page of his own volume with another.

Respecting the "Miscellaneous Letters," he tells us that they are not all "believed to be from the pen of Junius; and in the notes it has been attempted to distinguish such as are indisputably his from those which cannot be affiliated with certainty." After such an announcement, the reader, perhaps, will be more surprised than we were to find that Mr. Wade says not one word—hazards not a conjecture—for or against the authenticity of about three-fourths of these letters. On all questions of interest he is silent. He puts in no claims for "the bays" which we promised him if he would solve the mystery about "C." On occasions, however, he is profound and conclusive:—as when he observes that a letter "may or may not" have been written by Junius; on other occasions he is a little obscure:—as when we are told that "the first authentic public letter of Junius is dated January 21, 1769," though amongst the "Miscellaneous Letters" are two signed Junius, one dated the 21st of November, the other the 15th of December 1768,—and of the authenticity of these Mr. Wade has "no doubt." Other letters, again, he pronounces to be genuine on the authority of the date of one or other of the private letters,—but he has not answered our question as to the authority for the dates of these "private letters." He does not, indeed, appear to be in the least degree the wiser for our hint that some of them are manifestly wrong; and perhaps will not be so for our assurance that the dates of nineteen-twentieths—we speak by the card, and are to be understood literally—were assigned conjecturally by Mr. George Woodfall and Dr. Good more than forty years after they were written. This, it is true, was not done without consideration and investigation; but still Good and Woodfall might err,—and we are prepared with proof that they did err. How much it is to be regretted that this fact was not mentioned in Good's 'Preliminary Essay,'—what an amount of profitless and ridiculous speculation would thereby have been saved! Still, though Mr. Wade knows nothing, he has had the faith shaken out of him by the *Athenæum*, and gives up "Poplicola"—"Anti-Sejanus, jun."—the indisputable "Correggio," authenticated by the celebrated "C." in the notice to correspondents—"Downright," for insufficient reasons—"Bifrons," as "spurious"—and even "Atticus," as "improbable." We suspect, however, that these particular letters are not got rid of because Mr. Wade has any especial doubts as to their authenticity, but because the opinions therein advanced run counter to his theory as to the authorship.

The claim to attention which Mr. Wade seems to put forth prominently in favour of this edition is, the Index.—

"The Index has derived *considerable advantage* from Sir Harris Nicolas's labours, and is, in consequence, *much enlarged*; the research occasioned by the operation of blending his materials with our own, has led us to discover *the curious fact*, that in the previous edition of Junius, published by Woodfall, the name of Sir Philip Francis *is entirely excluded* from the Index, which is *the more remarkable*, as in other respects it is *singularly minute*."

We shall not trouble Mr. Wade to explain how an Index can receive "considerable advantage" from being "much enlarged" when it was already "singularly minute"; and we will assume that he means simply "omitted" when he states that Francis's name was "entirely excluded" from the Index; a distinction not without a difference in reference to this Junius question,—as an anecdote will illustrate. Many years since, the booksellers published an edition of Junius with portraits; and in a stray copy which reached America it happened that the portrait of Lord Temple faced the title-page. This gave rise to an octavo volume by a Mr. Newhall, wherein he undertook to prove that Lord Temple was Junius, acknowledging, at the same time, that he should never have suspected Temple but for this very significant hint. Now, if Mr. Wade's "curious fact," "more remarkable" and "entirely excluded,"

be allowed to pass without comment, it will be thought not merely a significant, but a conclusive hint, by all the Newhalls, equally in the Old World and in the New. We submit, then, for Mr. Wade's consideration, whether the insertion of Francis's name in that very imperfect Index would not have been much more curious than its omission; seeing that Francis is only once, and then incidentally, mentioned in one of the "Miscellaneous Letters,"—and that no speculator on the subject of Junius had ever thought of Francis until, as Mr. Wade himself tells us, that edition was published! Mr. Wade, we think, must admit, too, that this omission is not a more "curious fact" than the omission of the names of such men as the Marquis of Rockingham, Sir Fletcher Norton, Col. Barré, Mr. Wedderburne, Serjeant Leigh, Lord Littleton, Alderman Oliver, Mr. Calcraft, and some dozen more, all of as much importance as a clerk in the War Office. It is not a more "curious fact" than the omission of the names of the writers of some of the miscellaneous letters:—of "Vindex," "Recens," "Q in the Corner," "Anti-Stuart,"—left out also in Mr. Wade's "much enlarged" Index.

As to the "New Essay on the Authorship," we shall reserve what we have to say for the present, having received a pamphlet on the subject written by Sir Fortunatus Dwarris; and as both gentlemen fight under the same banner, advocate essentially the same claims, are both "Franciscans,"—we think it better to discuss the question generally. Enough now to observe, that Mr. Wade has exactly fulfilled our prophecy:—his hero turns out to be Sir Philip Francis, the "old friend *without* a new face";—and his arguments "are condensed from 'Junius Identified,' with such additional anecdotes as have become current since 1818."

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*The Decline of England*—[*De la Décadence de l'Angleterre*]. By Ledru-Rollin. Churton.

THE first Frenchman, whoever he was, who for the first time, a very long while ago, compared England to Carthage, has a great deal to answer for. He has been the progenitor of a numerous class of French writers who, converting his comparison into an absolute similarity, have considered themselves justified in arguing from thence the infallible decline of England and the ultimate and inevitable triumph of her rival, France. One of the most curious productions of this Punic school was, a book written by a certain M. Elias Regnault in 1841. *Delenda Carthago* was the menacing epigraph on its cover; and its lengthy title—a condemnation in itself—was as follows: 'Histoire criminelle du Gouvernement Anglais depuis les premiers massacres de l'Irlande jusqu'à l'empoisonnement des Chinois.' The conclusion suggested by the author was, that a European crusade should at once be undertaken against the obnoxious successor of Carthage. Fortunately, M. Elias Regnault was not a Cato, any more than M. Ledru-Rollin is likely to prove a Scipio; and his counsel did not bring the wished-for destruction on this country. Nevertheless, his book, like all other foolish books, has had its evil consequences. It has furnished at least one-third of the materials for M. Ledru-Rollin's still worse production.—We advert to it now so long after publication, because, though dealing for the most part with matters not usually discussed in our pages, it has certain aspects which we have not yet seen referred to, and with which we may deal.

In due deference to the laws of literary precedence, we have mentioned M. Regnault before entering on M. Ledru-Rollin's work: *à tout seigneur tout honneur*, says a proverb of their own country,—and original abuse is decidedly entitled to place before second-hand vituperation. There are, too, extenuating circumstances—we should say, doubts—in the case of the former *chef du cabinet du Ministre de l'Intérieur* (M. Regnault) which do not exist in favour of his former patron. M. Regnault's book was published in 1841. He may have been—let us hope he was—a young man at the time; and his so-called history of the Anglo-Carthaginian Government may have been only a manifestation of that Roman spirit which attacks most Frenchmen on their entrance into life,—and which in more healthy subjects takes the less malignant form of a five-act tragedy on the subject of 'Lucrèce,' or 'Virginie.' At any rate, he was an obscure man of letters then; and when his talents, aided by the caprice of Revolutions, made him the "chef du cabinet" of M. Ledru-Rollin, he employed his pen in tracing a history of the Provisional Government which—the writer's political views being taken into consideration—exhibits some of the essential qualities of a historian. There is some hope for him. But that M. Ledru-Rollin, who has "handled"—to use a French phrase—great matters, should condescend to the paltry compilation before us,—that a man whose talents are undeniable should have put his name to the blunders which it contains,—and, above all, that a professed lover of liberty should fail to recognize her under the shape which she assumes in this country, though that form be not the one under which he might wish to see her worshipped,—are things which seem inexplicable.

We wish it first, and above all, to be distinctly understood, that we completely set aside the reproach of ingratitude which M. Ledru-Rollin seems to foresee and to meet half-way in his preface. We perfectly recognize the right of every refugee to use and abuse this country,—to use it for his own convenience, and then to abuse it for his own profit or satisfaction; and we see no reason why an exile, from that circumstance alone, should be debarred from the use of his eyes and ears, or of his pen if he happen to have one. We only regret that in this case M. Ledru-Rollin should not have made a better use of his advantages. We claim no gratitude for hospitality which our laws impose on us as a duty, and which they afford indiscriminately to all political victims. Indeed, did the claim exist, England has been taught by too many contrary examples—from M. d'Haussez, the ex-minister of Charles X. to M. Ledru-Rollin, the ex-tribune—to expect that it will be allowed by her guests. M. Ledru-Rollin need feel no self-reproach for having ill requited a hospitality which would have been equally extended to Haynau or Mazzini, to Montemolin or to Proudhon. Indeed, we may even add, to set his conscience quite at rest, that had the matter implied any particular personal sympathy instead of being the natural result of our laws, we think it more than probable that M. Ledru-Rollin would never have enjoyed the opportunity of giving his accusations to the world with the authority of an eye-witness.

But if we admit that M. Ledru-Rollin's liberty as an author remains entire notwithstanding his peculiar situation, it follows as a natural consequence that our privileges as critics are also unimpaired thereby; and the right of undertaking his task once recognized, we remain at liberty to pronounce that the attempt has been a complete failure. In saying this, we have no fear of being accused of giving way to undue national susceptibility; our columns afford proof of the impartiality with which volumes scarcely more flattering to England than M. Ledru-Rollin's have been treated. This work is not only unfair and erroneous in many of its statements;—it is deficient in a quality which most French works, even of the worst kind, possess. There is no proportion in its parts,—no method in its composition. It has been said of us—and perhaps with some truth—that many Englishmen write fine pages, but that scarcely one knows how to make a book. If it be true, in this respect M. Ledru-Rollin has proved himself English. He is totally wanting in that methodical clearness with which his countrymen generally expose even their least tenable propositions. We have said, that for about one-third of his book he is indebted to M. Elias Regnault: about an equal portion is composed of extracts from the Reports published recently by the *Morning Chronicle* on the distress of the working classes,—while fragments of political speeches, extracts from blue-books and black-books, and from the 'Song of the Shirt,' serve to make up the remainder. Of the chapter headed "India," more than a third is devoted to Warren Hastings:—and the same want of proportion is observable all throughout.

On the rare occasions in which M. Ledru-Rollin speaks in his own name, some of his judgments are curious. We leave to others the care of pointing out his blunders in figures and legislation; and will take our examples from a chapter which treats of subjects especially within our province. Of Shakspeare M. Ledru-Rollin thus writes.—

> The English drama no longer exists:—it expired with Sheridan. It has become merely a gross and monotonous echo of the vaudevilles and melo-dramas of the Continent; and if Shakspeare—so long forgotten—is now in honour, he owes it not to his fiant and immortal genius. It is the client sheltered beneath the Elizabethan purple, the partial chronicler of national wars, the great poet glorified by foreign applause and the idolatry of Europe, that England reveres in him. She glasses herself in his divine poems, unconscious of their depths;—and her worship is but the pride of self.

Who in this portrait would recognize the ideal of honest Will Shakspeare; whom popular tradition, far from associating with courtly splendour, delights in making the hero of poaching exploits and tavern adventures, and whose fame, instead of being the reflection of Continental celebrity, was scarcely allowed out of his own country only a few years ago! Surely M. Ledru-Rollin does not pretend to say that it was the mutilator Ducis who first brought Shakspeare into notice,—or that it was Voltaire, who first signalized the "*sauvage ivre*" to the admiration of his countrymen? Really, if M. Ledru-Rollin had been residing in Paris lately, we might suspect him of having derived his notions of Shakspeare from the little comic opera entitled '*Un Songe d'une Nuit d'été*,'—in which "good Queen Bess" is so sadly compromised with our poet.

The remarks on Milton are stranger still.—

> Milton has no lamp in his sepulchre. Protestant England has never felt aught but ill-will towards that austere and noble genius who three centuries ago took his place between Dante and Shakspeare. England admires 'Paradise Lost' less than she remembers the death-warrant of Charles the First.

As M. Ledru-Rollin accuses us of being a people of facts and figures, he will doubtless attribute to an inherent national defect the minuteness which prompts us to remark that "three centuries ago" carries us back to 1550. It is difficult to suppose that there could have been any confusion in the author's mind between Edward the Sixth and Oliver Cromwell, and it is more charitable to imagine that he supposes Milton to have been born in 1550 and to have lived in consequence 124 years.—In the same spirit of arithmetical criticism, we will

venture to assert that out of one hundred Englishmen who read 'Paradise Lost,' some fifty know little about Milton's political career,—and perhaps not ten have read any of his political works.

A few pages before this, we had been told *à propos* of Bacon :—

One vigorous and transcendant genius had aspired to spiritualism and generalization: for England had produced Bacon, the great encyclopædist of the sixteenth century. But facts, always facts, were to re-act against the ideal; and Bacon was set aside for Locke, the anatomist of Sensation,—in the same manner that More and his generous aspirations were to be discarded for the figures of Malthus. And of a truth it was but just;—for to a polity of *facts*, a religion of *facts*, a social economy of *facts*, what philosophy could ally itself so well as the philosophy of facts or of sensation?

How far M. Ledru-Rollin has erred in his appreciation of the comparative popularity (if we may use the word) of Bacon and Locke, we leave to the judgment of our readers :—but the passage in which Sir Thomas More and Malthus figure in such strange juxta-position deserves a commentary. Does the author mean seriously to reproach England with not having adopted the Utopia as her guide?—and if so, why lay the blame of the rejection on Malthus? Surely, Malthus came long enough after More to be not answerable for what the world had been doing in the mean time. Were all Englishmen Utopians until the doctrines of Malthus made their appearance? At any rate, it ill becomes M. Ledru-Rollin,—who during his temporary dictatorship neither followed the "generous aspirations" of More or Campanella, nor encouraged the more recent "aspirations" of Cabet,—to reproach us with our scepticism as regards Utopia.

M. Ledru-Rollin's politics are too well known to require comment. They are exhibited in these volumes chiefly by his attributing to the gold or the perfidy of England every wrong and every misfortune which has befallen revolutionary France, from the depreciation of her *assignats* to the death of Kleber by an Egyptian dagger. He is, however, unusually severe on a man for whom it might have been expected that he should feel at least the sympathy of a fellow-agitator. It becomes evident that no one born in the British Isles can find favour in M. Ledru-Rollin's eyes, since he writes of O'Connell thus :—

O'Connell, who had been the great promoter of Catholic emancipation, took good care not to lead his country into the real paths of freedom. After having condemned, betrayed, and denied the great revolutionary tradition of the Wolfe Tones and the Fitzgeralds—those unavenged martyrs—he fed famishing Ireland with his ballads, and as a last hope threw her a new dream—the Repeal of the Union. He, the friend of the Whigs, the courtier-tribune, who had so often humbled Ireland at the feet of his *gracious Queen*, he well knew that his promise scattered to the winds was but a lie; that England would never suffer the doors of the Irish Parliament to be re-opened except by a revolution; and that in any case, that Parliament would not restore to his native land its independence, its wealth, and its nationality. But he also knew that great sorrows are easy to delude, and while he continued to be richly provided for by the rent levied on the paupers whose rags formed his *cortège*, he pointed to the ever-receding horizon, and showed them the resplendent gates of their future Jerusalem. The name of that man, who was great by his intelligence but cowardly at heart, will be branded in history with a traitor's cross; and a day will come when Ireland, liberated by her revolutionary democracy, will reject and curse his memory. In what condition was Ireland left by that man whom she had fed for thirty years with her bloody sweat, and whom she would have followed—turning her last ploughshare into a sword—into the midst of the enemy's citadels—into the very heart of England itself?

This must be our last extract;—but, in concluding, we must make one remark. M. Ledru-Rollin boasts that his gloomy picture of the deplorable state of this country is borrowed from our own reports, speeches, &c. He forms his opinion of England in general from what Whigs say of Tories, Tories of Whigs, and Radicals of both. It is scarcely fair to take us at our own valuation,—for we are essentially a grumbling people; but this very grumbling disposition bears in it the seeds of every improvement. No one need fear for a nation so keenly alive—by M. Ledru-Rollin's own showing—to its wants and deficiencies. One lesson, however, Englishmen of all shades of politics may learn from these volumes—when they quarrel, not to abuse each other quite so loud, lest foreigners should be listening.

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*Glimpses of Spain; or, Notes of an Unfinished Tour.* By Samuel Wallis. New York, Harper & Brothers; London, Low.

THE republication here of an American book on a subject well worn by our own travellers, would seem to require the inducement of some merits not to be found in English works. A description of the writer's means and manner of viewing Spain will show what reasons exist for offering his "Notes" to any but the public for which, we suppose, they were taken.

On the results of his personal inspection, in spite of some formal apologies for its insufficiency, Mr. Wallis reports in a very confident tone. His opportunities for judging are, therefore, to be kept in view, notwithstanding these apologies. In the first place, however, let us say that he appears to have been conversant, before leaving home, with the language and literature of Spain. This, of course, might have been of great use in any deliberate study of its features; it must have added to the pleasure and ease of the most cursory visit; and it would have been serviceable to him in writing at home on Spanish history or letters. But on a fugitive glimpse of the country, it could not supply the defects of observation, however it might heighten its passing interest.

Mr. Wallis seems to have reached Europe in the winter, travelling in search of health; and having failed to find it in "the mists and blasts of beautiful France, and the snow and sleet of sunny Italy," and being still in a rather bilious condition, he turned his eyes towards Spain, which had been from boyhood his land of promise. It did not, however, produce the desired effect, and his stay was suddenly curtailed by renewed illness. He returned to America; more dyspeptic, it is to be feared, than when he first embarked for Spain.

Dates are useful things. Here they enable us to fix the current value of the "Notes" sent hither for circulation. Mr. Wallis left Marseilles in a coasting steamer on April 1, 1847, and sailed from Gibraltar in the Southampton packet on the 27th of the June following. Of the eighty-six days included between these dates, *nine* were passed in a sick room at Granada, eight at Gibraltar, "waiting for the steamer," and more than a dozen at least on coasting voyages, or in stage conveyances. If we allow fifty days for the time during which he can have been taking any "glimpses," excepting such as may be seen from the deck of a steamboat or the window of a diligence, we shall not have much underrated the space that can have been devoted to an immediate view of the country. What he saw was gathered as follows.—Proceeding first to Barcelona, he stayed there, and at the other ports of Valencia, Alicante, Cartagena, and Almeria, just so long as the steamer remained at each; in the longest instance no more than three days (at Barcelona),—at most places about twelve hours. At Malaga, where this summary way of travelling ceased, he spent above a week; then went on by steam to Cadiz and Seville,—where alone any considerable pause took place. Hitherto he had merely skirted a part of the coast, landing here and there, and hurrying on. From Seville his only inspection of a small part of Andalusia was made; first on a run to Cordova, in diligence both ways, where he remained for *four hours*,—next, in a three days' ride from Seville to the fair of Ronda,—his solitary experience of any travelling peculiar to Spain: then, after returning to Malaga, in a fortnight's stay at Granada,—half taken up with sickness. From thence he hastened back in a diligence to embark at Malaga in a coaster for Gibraltar; and there took leave of Spain: passing glimpses of Lisbon and Vigo, while the packet lay there, being incidents that could add nothing to his personal knowledge of the Peninsula.

Thus, what he saw of it was confined to hasty views of a few cities on the coast, with short residences at Seville and Granada, and excursions to Cordova and Ronda. A glance at the map will show how small a part of Spain is included in these limits. The incompleteness of such a survey is confessed by the author in his Preface,—where he admits its "humble pretensions;" and he elsewhere allows that "the limited sphere of his own observations would make it quite ridiculous to set up his judgment on the results of what he saw as anything but *very partial and imperfect*." Nor should we have insisted on this disadvantage had the recollection of it prevented Mr. Wallis from adopting throughout his 'Notes,' in respect of the statements and opinions of experienced and competent reporters, the tone which he himself instructs the reader to describe as "ridiculous." The contrast between an admission of his "partial and imperfect" observations and the confident air with which he steps out of his way to censure other travellers, is one of the many inconsistencies which will be found in these 'Notes of an Unfinished Tour.'

It is clear that as regards the scope of Mr. Wallis's view of Spain, he can add nothing to what we know already on this subject. Indeed, with the exception of a few pages on Seville, and of the account of his ride with a party of bull-fighters to Ronda, there is absolutely nothing in his 'Notes' belonging to the country itself, that has not been often and better told already. Of the beauties of the Alhambra we have sketches in abundance; and bull-fights have been described till the subject is quite exhausted. The rest of what he saw could, of course, be only a superficial view of the cities which he visited in the summary way above stated.

The matter being thus scanty, the manner of presenting it could alone give the book a merit worth producing abroad. In the shortest journey, a traveller from the New World, with an open sense and a genial spirit, may find enough to make a pleasant journal if he can write simply and agreeably of what he has seen with healthful eyes. In neither respect is Mr. Wallis peculiarly fortunate. His mode of writing is neither unaffected nor elegant: the effort to be smart or satirical is more apparent than its success; and he is not a little prone to a kind of rhetoric which in this country is used chiefly by the caterers of small paragraphs for country newspapers.

But a worse fault of his 'Notes' is, a certain soreness of temper which constantly breaks out in them; chiefly on matters of grievance that, at all events, have nothing to do with impressions of Spain, but which seem to haunt the author in a way that must have been unfavourable to his enjoyment of any country. At every place

some fretful reference to England seems to vex his mind; and sallies, meant to be sarcastic, against "John Bull" and "Anglo-Saxondom" are painfully obtruded in scenes where we might have thought the most irritable traveller would have forgotten all grudges that must have had their origin elsewhere. The frequent intrusion of this sour element, aggravated perhaps by the bilious vein of an invalid, is not likely to compensate, to English readers at least, for the want of other novelty in the proper objects of a Spanish tour. If this seasoning be a merit with readers in the United States, the taste which can relish such misplaced asperities may indeed be regretted for their sakes,—although it is no business of ours to question or correct it. But as the book has been offered to the English public too, we are justified in stating how the contents of a book, otherwise of no surpassing merit, are leavened,—in order that readers here may understand the claim which it has to their attention and welcome.

This unhappy vein, which oozes out all through the journey, appears in the earliest pages; where Mr. Wallis finds occasion for a "traveller's story," the sole point of which is the unsociable taciturnity of the English as compared with conversible and cheerful Americans,—*à propos* of a "representative of Anglo-Saxondom" whose offence was "persisting in cackling at all hazards;" in other words that he was *not* taciturn or unsociable! The same temper is displayed wherever an innuendo can be suggested, without any apparent provocation,—and gives rise to not a few inconsistencies like that above mentioned. To this we must ascribe the constant desire of criticizing Mr. Ford, whose 'Hand-book' seems to have been a standing topic of uneasiness. After the critic's own definition of the "ridiculous" character of any attempt to "set up judgments" of Spain on the "partial and imperfect" acquaintance of a six weeks' trip, it will scarcely be believed that he nevertheless ventures, with no very "humble pretensions," to sit in judgment, with the confidence of one that had lived in Spain for years, on the accounts of travellers of all nations in general, and on Mr. Ford's in particular:—summing up with a *dictum* to the effect that of all and sundry accounts of Spain there is none to be trusted but that of a certain Captain Widdrington,—who, of course, writes U.S. after his military title. This sentence is rendered more diverting by coming immediately after the confession, already cited, of incompetence to judge at all; and some few pages only after a remark that "the traveller who visits Spain for pleasure or improvement will fail egregiously of both, unless he makes up his mind to forget . . . the prejudices of his social, political, and religious education." A droller instance of the degree to which self-love may grow blind to self-contradictions could hardly be devised.

To the same disposition other inconsistencies may be traced. In Granada, Mr. Wallis is very busy in detecting an error in Irving's small account of the act of surrender by Boabdil; and thinks he has done well in correcting a mis-statement of its precise locality. But he is much offended by Mr. Ford's simple exposure of certain fictions in the same author's 'Sketch Book,' respecting more modern inhabitants of the city. He testifies, on more than one occasion, to the practical mischief, folly, and impotence of the Spanish custom-house prohibitions, with the universal contraband which they have provoked,—relates the fact of the very Barcelonese manufacturers themselves ordering imitations of their wares from England, to be smuggled into Catalonia,—rises into a fever of indignation at the immorality of our countenance to the lawless trade at Gibraltar,—quotes Lord Londonderry as authority for the statement that Spain buys from us as many smuggled goods as she could take if the trade were free,—and yet sneers at Mr. Cobden for trying to persuade Spanish statesmen of the fiscal and moral advantage to themselves of amending this noxious system. On the ethics of smuggling, Mr. Wallis moots a question on which the answer that he professes to desire can be easily given. After quoting some random speech of Lord Brougham's, to the effect that the chief value of Canada to England is the contraband trade on its frontier,—he goes on to say "It only remains for us to have an essay from the same noble and philosophical hand upon the difference in point of 'natural theology' between *thieving* of the sort which he defends and what they call in England 'Pennsylvania ethics.'" Mr. Wallis, being a lawyer, would hardly thank us for supposing him unable to perceive the distinction. On reflection he will see that the difference is "pretty considerable" between an artificial offence and one which natural ethics condemn. In the one case, the "thieving" consists of selling to the subjects of a foreign country wares which they are eager to obtain, when the folly of a Government to which the alien trader owes no allegiance forbids them to obtain such wares in the natural way of trade. In the other case, the offence imputed breaks an eternal obligation—of good faith between man and man,—not created by fiscal law merely, but resting on ground as old, at least, as the Decalogue. The slightest notion of what Mr. Wallis terms "natural theology" will suffice to show that there is no parity between such different kinds of delinquency.

While Mr. Wallis somewhat roundly lectures those wayfarers who expect to find home comforts wherever they go, we observe that on the only occasion when he has to "rough it" in Spain he cries out against "dog-holes" of *ventas* and their fleas, complains of bad roads, hot sun, and sorry fare, about as loudly as any traveller whose journal has been published since the days of Horace. Those who wish may compare the humour with which our last English traveller, the Hon. Mr. Murray, faced much ruder hardships in the same region, with the bearing under such rubs of the American lecturer on hardihood, in order to see whether the fault imputed to our countrymen is either so universally or so exclusively an English offence as Mr. Wallis desires his readers to believe.

Had he been well advised before publishing this book, Mr. Wallis would have expunged from his "Notes" either the sneers at Mr. Ford's "Greek and Latin," or his own scraps of the latter, which are pressed into service with more pains than felicity. If it be well in him to adorn his pages with trite patches of school-boy or law Latin, it cannot be very becoming to scoff at elegant scholarship and apt quotation from more recondite sources, in the book of another writer,—whose happy use of classical learning is justly admired by educated readers.

Mr. Wallis seems to be aggrieved by the frequent mention of "the sempiternal Duke" in the 'Hand-Book.' Here his impatience of "English passions, grudges, and partialities" has led him to make rather too hasty a display of some American dispositions of the same kind. We need not point to the fact, that a guide for English pilgrims naturally leads them to scenes which they must view with interest,—however little pleasure these may afford to a traveller whose admiration of military glory is engrossed by the exploits of the Mexican war. Another point of more general significance, which Mr. Wallis has quite overlooked, is, the plain fact that the events of the Peninsular War have now, and will evermore possess, an historical interest to visitors—not from England only, but from all other civilized countries—as strong as that which lives in the spots impressed with memories of Scipio or of Pompey, of the Moorish Emirs or of the Gothic Pelayo or Cid. He can scarcely require to be told that those events fill one of the most notable chapters in Spanish history, in which "the sempiternal Duke" must to all time be the principal figure; so that future historians, of whatever nation, when identifying the scenes connected with the hero of those transactions, will thank Mr. Ford for the very diligence which seems to have offended this American traveller.

Mr. Borrow, too, is brought up to be reprimanded for inaccuracy. On this case, our room being limited, it will suffice to observe that as regards him, as well as Mr. Ford, both long residents in Spain and familiar with all its regions, Mr. Wallis has himself told us what to say of the writer who ventures to "set up his judgment" on persons of such experience as theirs, from "the limited sphere" of an observation of some six or seven weeks, confined to a mere strip of the Spanish frontier. This, on his authority, we shall once more describe as highly "ridiculous"; and note, as a last instance of the perversity that warps his comments on the doings of the English, that he imputes a want of judgment and of "earnest desire" for the objects of his mission to Mr. Borrow *personally*, on the ground that he—being, as all know, sent out by the Bible Society to circulate the Protestant Scriptures—did not, instead of attempting to fulfil that special object of his mission, employ himself in diffusing the Roman Catholic version of the Vulgate set forth by the Spanish hierarchy.

It remains to add, that the style of the work which contains these specimens of "imperfect and partial" judgments is not choice enough to redeem ungenial displays of captiousness. Mr. Wallis is more prone to dress up slight things in heavy words than will be liked by readers of good taste. An instance or two of this kind of facetiousness will suffice. A scold is, "one of those ladies, of lively and elocutionary propensities, for whose weaknesses the common law has provided, in its gallantry, a pleasant hydropathic remedy." A kitchen-room in the Giralda "compels you sometimes to pay an olfactory tribute to an especially culinary atmosphere." An old woman is, "a brown-skinned executive-looking matron, arrived at that period of life when ladies sometimes acquire a fondness for a narrative style." This elaborate drollery is now and then set off by a kind of diction pretty well known in one manner—not the best—of Transatlantic writing. Of a dancing-girl, it is said: "The silkiness of her hose was *not much to speak of*; but her *dancing implements* were excellent to look upon *as such things now-a-days go*." Of the salutation "At your feet, lady" (*à los pies de Vmd., Señorita*) we are told that, on the Alameda of Cadiz, "at the first *view of the article*" the compliment is seen to be far from humiliating. At times a more serious flight is made towards the sublime:—with what success a specimen of Mr. Wallis's elevated manner will show. Zamora, "one of those high horns of earth on which the Moor loved to hang his turban," is further described as "a rocky cone, to which it seemed the *very eagles would have need of scaling-ladders!*" We need not dwell on minor peculiarities of speech, such as "indorse your taste," "well posted in geography," "moving back and forth." But we pause for an instant at the tomb of Fernando Columbus, when told that the inscription is copied verbatim,

in order that "the reader may depend on having before him the *genuine article!*"

To such beauties of diction Mr. Wallis adds some novelties in spelling,—which, until we found them constantly repeated, were unjustly charged by us to the printer's account. He writes *theater*, *traveler*, *center*, *somber*, *defenses*, *vails* (veils), *luster*, *accouterments*, *moldering*, *plow*, &c. This defiance of etymology,—following in part the unlearned example of the Phonetic school,—if pursued and extended, with the aid of such varieties of speech as are noted above, will, no doubt, go far towards banishing all traces of "Anglo-Saxondom" from American literature. The words, however, to which Mr. Wallis has so far confined his enterprise being mostly derived from classical roots, his attack on them may possibly be only another way of expressing the contempt which he insinuates for "Greek and Latin." The effect, whatever may be the motive, will not please readers "prejudiced" in favour of the usual mode of spelling English, who will be apt to think the new method no better than the return to a style now no longer universal even in butchers' bills or cookmaids' valentines.

In fine, we see no sufficient reason for bringing Mr. Wallis hither for publication. He adds nothing to the matter of our knowledge of Spain; his manner is not so exquisite as to make precious the hasty gleanings of a very limited excursion:—and his fretful ebullitions, where there could be no fair motive for stirring up any bitter sources, cannot of themselves recommend his book to English readers. The productions of foreign genius or wisdom may always be sure of finding due welcome in this country; nor shall we the less readily appreciate them on account of anything sharp or even severe against us that they may contain. But we cannot extend this allowance to works the mediocrity of which is not even made pungent by a seasoning of ill-will towards those who are asked to buy them. If we are to receive inferior books from the United States, we may fairly require that they shall at least present themselves, not with airs of cavil and offence, but with the graces of good humour and good manners:—to which shall we add good spelling?

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*Memoirs of the Life of William Wirt, Attorney-General of the United States.* By John P. Kennedy. 2 vols. Philadelphia, Lea & Blanchard.

THERE is no man, said Goethe, so commonplace that a wise man may not learn something from him. This is true in all countries. Dr. Johnson wished to see the actual history of a few of the very humblest well written out,—certain that it would contain much that might interest the scholar and the statesman. The wish has found a larger expression and some realization in our own day. The life of Mr. Smith may contain few of the elements of romance perhaps,—the career of Mr. Jones may not have been so varied and dramatic as those of the older heroes of biography; but the interest that would fail to attract attention to the individual, as such, does not fail us when we think of him as the representative of a large portion of the race. In mental conditions, in outward fortunes, in opinion, and in moral character, Mr. Smith or Mr. Jones is the type of perhaps nine-tenths of our population. This circumstance lends a sort of importance, if not of dignity, to his position. With much more truth than ever Louis-Quatorze or Napoleon used the phrase, either of these personages might say,—"L'Etat? c'est moi!" A friend of ours, whose duties—unlike our own—are of political complexion, when any great catastrophe has occurred—any revolution abroad or commercial panic at home—to threaten the machine of government or the orderly march of society, goes instantly to consult Mr. Smith as to what ought to be done under the circumstances; not because Mr. Smith is thought to be wiser than his neighbours, and better able to disentangle the threads of an intricate policy,—but simply because he is an elector of Great Britain, and represents in his own person the opinion of at least a million of the eleven hundred thousand respectable adults who compose the rate-giving community. Such a man is of more consequence in the world than the superficial will be apt to imagine.

The life of William Wirt—a respectable member of the great family of Smiths—has just the sort of attraction that would belong to the clearly written-out life of any undistinguished but moderately successful individual in almost any other walk of life. The name will be strange to the great majority of English readers. Though Attorney-General to the United States, he has been heard of by few persons out of his own country, and was not extensively known even in it. He was not blessed with brilliant talents—nor did any of those unaccountable accidents which sometimes make the fortune of public men with little or no action on their own part raise him to any very brilliant and commanding position. His career was one of professional routine, unchequered by important or exciting events, and the even tenor of which was hardly disturbed by the usual amount of incident. It may, therefore, seem to many unnecessary to have endowed him with the public honours of biography,—at least on the colossal scale adopted by Mr. Kennedy; who has thought it right to expend more ink on the memoirs of this obscure American lawyer than Thucydides considered necessary for the whole record of the Peloponnesian War!

Nevertheless, on the principle before stated, we are not sorry to have received these volumes—nor do we rise from their perusal with the feeling that our time has been thrown away on a profitless task. Mr. Wirt was in every sense an ordinary man—in his virtues and in his frailties, in his weakness as in his strength. To ordinary men his life may, therefore, afford more useful lessons perhaps than the memoirs of an individual more completely *sui generis*, like Washington or Bonaparte. He commenced life with the advantages of good average ability and a restless and far reaching ambition. His great aim was to acquire literary fame and leave lasting monuments of thought behind; he cultivated letters, therefore, with assiduity,—and, we must add, with some success. But his inspirations were not of that noble and self-denying order which the worship of the Muses demands. He wanted that true enthusiasm which can sacrifice the world to gain immortality. Wirt had not sufficient courage to reject the pomps and vanities of life. He felt a morbid craving after dollars,—and was drawn on to become a lawyer in order that through the law he might become rich and powerful. His weak and essentially ordinary character is apparent throughout. He dared not accept poverty and renown such as he might win; he could not reconcile his mind to obscurity and wealth. He tried to compromise the matter,—and, like nearly all compromisers, he failed. That it is possible at one and the same time to coquette with Letters and flirt with Law several instances in our own country, ancient and modern, have proved; but of the attainment to a distinguished position in both branches of culture, Bacon is at once the example and the exception.

William Wirt was certainly not a Francis Bacon; but he had talents which a steady devotion to one object might have enabled him so to cultivate and develope as to have given him a fair place among the legal or literary names of his own country. He failed in all through his infirmity of purpose. A man cannot serve two masters. He failed to achieve a fortune—and he failed to achieve renown—because he could not make his election and throw his whole mind into his task. He wrote books which, though in their day they had a sort of success, are now forgotten; he made speeches few of which anybody thought it worth while to report; and he became Attorney-General of his native land without growing rich or connecting his name with the current history of his time. This is the lesson of his career.

In itself the Memoir is not what the reading world calls interesting. There is no action and little incident. The letters are the best portion. Wirt could write in an agreeable manner; his correspondence and his speeches are perhaps better than his more elaborate compositions, such as 'The British Spy' and the 'Life of Patrick Henry,'—for his style was large and ornate, and not unapt to run into hyperbole and extravagance.

In this collection there are several letters of advice to young law-students. The following was written to one of the order in Wirt's mature age, and, judging from the style, when his mind was most vigorous.—

"Have you ever dipped into the works of Edmund Burke? I do not think he is properly estimated in our country, nor, I suspect, in his own, except by a few. His speeches have so much richness and splendour of imagination, that the great mass of readers seldom look farther, and know nothing of the abundance, the greatness and accuracy of his thinking. I have been conversing with him in the first volume of his works, which I have found here, and have been much struck with the powerful grasp of his mind, compared with some other modern writers who had just passed through my hands. He is indeed a *masterly thinker*, and I commend him to your acquaintance. I like his essays better than his speeches—for they are *all thought*, without any ambition of ornament, and show the great play of his mental machinery, in the naked majesty of its strength. Such are the models on which I would wish you to form the action of your mind. You must look far above and beyond the living models that meet your daily view. These are, some of them, good examples of energy, pushing industry, and untiring perseverance, and are, so far, highly worthy of imitation. But when you come to the article of *thinking*, with reference to professional preparation, you must look far, very far, beyond and above them. You must take a wider horizon—sweep in larger circles—draw your arguments from greater depths—and learn to fold your adversary in coils of a more *Anaconda* gripe. This pungency and force of thinking, this fertility of resource, this depth and breadth and amplitude of view, is to be learned only by *studying* the greatest masters. Take up, for example, Butler's Analogy of Natural and Revealed Religion, and study it as a specimen of thinking and reasoning. Observe how profoundly and widely he surveys his subject—how carefully and beautifully he evolves his argument—and with what resistless cogency he draws his conclusions. Bacon's Essay on the Advancement of Science, Locke on the Human Understanding, and on Government, and some of the preliminary chapters of Hooker on Ecclesiastical Polity, are on the same gigantic scale of thinking. These Essays of Burke, and the constitutional opinions of Chief Justice Marshall, belong to the same great class of intellectual effort, and you ought to become familiar with them. In composing, think much more of your matter than your manner. To be sure, spirit, grace, and dignity of manner, are of great importance both to the speaker and the writer; but of infinitely more importance is the weight and worth of matter. The fashion of the times is much changed since Thomson wrote his Seasons, and Hervey his Meditations. It

will no longer do to fill the ear only with pleasant sounds, or the fancy with fine images. The mind, the understanding, must be filled with solid thought. The age of ornament is over: that of utility has succeeded. The *pugnæ quam pompæ aptius* is the order of the day, and men fight now with clenched fist, not with the open hand—with logic and not with rhetoric."

This is true and well expressed.

We have no idea of going over the Memoir methodically. Beyond the moral which we have adverted to, it yields little in the shape of result. This moral is, however, forcibly exhibited in the Letters—though it never once catches the attention of the biographer. In one place Wirt writes—"This indiscriminate defence of right and wrong—this zealous advocation of causes at which my soul revolts—this playing of the nurse to villains, and occupying myself continually in cleansing them—it is sickening, even to death." Yet the desire for dollars kept him to his tasks.—Mr. Kennedy has done what he had to do with zeal and ability. But the book is not likely to take much hold of English readers, from the absence of all stirring interest in the narrative.

## OUR LIBRARY TABLE.

*Tales and Sketches in Prose and Verse.* By the Hon. Mrs. Norton.—This is one of the pleasantest cheap volumes of late put forth, being a reprint (or memory has tricked us strangely) of Mrs. Norton's contributions to the *Court Magazine* some sixteen years ago. When we return to these touching prose sketches, and these musical lyrics, many of them the spontaneous utterance of true feeling,—how can we forbear regretting that their gifted writer has not more completely worked out her destiny as a songstress and a novelist? In these fragments there is promise of a high order, to which Mrs. Norton's performance has borne little proportion.—The book forms part the third of Churton's 'Library for the Million.'—Part the second may as well here have a notice of a somewhat different import from the above. We perceive that it consists of Mr. Prescott's 'History of the Conquest of Mexico' condensed by the Rev. J. Hobart Caunter, and advertised in the following prospectus.—

"It is so true that a 'man's time is his money,' that he may be considered a public benefactor who can devise the means of obtaining an object at the least possible cost of time, but he who can point out the means of saving both time and money confers a double benefit on the community. It is the aim of the projector of this library to attain these ends by reproducing in an abbreviated form, carefully condensed and rewritten, such STANDARD AUTHORS as are at present too voluminous to suit the time, or by reprinting in their entirety such as are too expensive to suit the purse of the general reader."

The above proclamation, it will be owned, is a cool announcement on Mr. Churton's part of a piratical scheme for spoiling, in more ways than one, the authors whose copyrights he has not purchased.

*The Orphan, a Romance.* By "Mootoo."—We will leave Mr. Ainsworth and Sir E. Bulwer Lytton, or some other author versed in gipsy dialect, to accredit or discredit the romantic and resonant dialogues put into the mouths of the gipsies by whom the separate scenes of "Mootoo's" mystery are conducted. When we come to the level narrative we are reminded of the schoolboy's letter (written, we think, by Hood) in which all manner of topics run on one after the other, without stop, let or hindrance. We are sorry, after "Mootoo's" deprecatory address, to be unable to speak more flatteringly of his 'Orphan,'—but it is really a very poor little one.

*Fun, Poetry and Pathos: or, the Cornucopia: a Miscellany.* By William Young Browne, with an illustration by John Leech.—Mr. Young Browne shall be allowed to describe his cornucopia as he wills—without our inquiring, as a Lindley might on a Chiswick day, into the value of its flowers—or as a Covent Garden haunter on marketing intent should, into the ripeness of its fruits: and this permission shall stand us in stead of review, since it will sufficiently indicate to "the stranger" that we may possibly be harder to please than would please Mr. Browne, or suit his means to satisfy.

*Vert-Vert; from the French of Gresset.* By R. Snow.—This poem is, from its elegance, very difficult to translate satisfactorily. Many of the renderings, however, in this version are clever,—and the whole is accomplished with considerable grace and facility of execution. Sometimes the letter is sacrificed; but in general the spirit of the poem is sufficiently preserved. Its perusal will afford pleasure to the reader of taste; notwithstanding that he may be disposed to rebel here and there against some of the translator's liberties and substitutions, together with a licence and variety of versification not warranted by the original.

*Hints to all about to Rent, Buy, or Build, House Property.* By Francis Cross.—We have been amused and informed by the perusal of this little volume. Every man, or nearly so, is "about to rent, buy, or build a house;" and in whichever case he may find himself for the moment, Mr. Cross's hints will be useful to him. A vein of satire runs through his pages which renders them sufficiently lively to be interesting to the general reader also.

*The Relations of Faith and Philosophy.* By H. B. Smith.—In this address, delivered by a professor of Amherst College, Massachusetts, at the anniversary of the Porter Rhetorical Society, the orator seeks to find an identity between the principles of true philosophy and the realities, as distinguished from the formulæ, of religion.

*Progressive Lessons in Social Science.* By the Author of 'Outlines of Social Economy.'—This little *résumé* of the doctrines of political economy as now accepted by a large class, is intended for the use of teachers and conductors of schools and of the discussions of mutual improvement societies. It sets forth the current opinions in a clear way,—and in saying this we are giving high praise to the writer. It is a proper introduction to the use of the 'Outlines.'

*History of Great Britain and Ireland; with an Account of the Present State and Resources of the United Kingdom and its Colonies.* By Henry White.—A carefully compiled history of England for the use of schools. The writer has consulted the more recent authorities: his opinions are liberal, and on the whole just and impartial: the succession of events is developed with clearness, and with more of that picturesque effect which so delights the young than is common in historical abstracts. The book is strongly bound—and is accompanied by a good map. For schools, parish and prison libraries, workmen's halls, and such institutions, it is better adapted than any abridgment of the kind we know.

*Observations on the Working of the Government Scheme of Education; with Practical Suggestions for rendering it a Means for diffusing more equally a Suitable Education for all Classes of the Poor, in a Letter to the Lord Bishop of London.* By a National Schoolmaster.—The National Schoolmaster has some objections to urge against the minor details of the scheme of education. It was to be expected that difficulties would arise; that experience would yield results more valuable than the very best theories could predict and prepare for. Among other things, he objects to the promise held out in the broadsheet to unsuccessful teachers-apprentices, that to "certain of them Government will open the way to appointments in the public service which have hitherto been considered as political capital." He thinks this promise cannot be kept on a large scale; while, on the other hand, every apprentice will look to have a certain appointment in case he fails to establish his title to the rank of a teacher. This delusion will lead to evil consequences, when it applies to a body of men 80,000 or 100,000 strong. To those who are studying the education question as a practical operation, we can recommend a perusal of the details and suggestions of this pamphlet.

*Political Equity; or, a Fair Equalization of the National Burdens, comprised in some intermingled and scattered Thoughts, suggesting an Anti-Destitution Policy, a Graduated System of Taxation on Real Property and Regular Incomes, a Non-Inquisitorial Mode of collecting the Tax on Trade, a gradual Liquidation and an ultimate Extinction of the National Debt, &c.* By Theophilus Williams, Author of 'Academical Stenography.'—We quote the whole of this extraordinary title,—there being a statement in the short Preface annexed to it which excludes the idea of applying criticism to a work so heralded into the world. The author says, he is suffering "from two attacks of paralysis;" and that he has "devoted the last glimmers of perception" to composing this treatise.

### LIST OF NEW BOOKS.

Alton Locke, Tailor and Poet, 2 vols. post 8vo. 12s. cl.
Art of Verse, a Poem, by a Practitioner, 8vo. 2s. 6d. bds.
Baker's (T.) Rudimentary Treatise on Mensuration, 12mo. 1s.
Bonnycastle's Elements of Algebra, Key to, 12mo. 3s. bd.
Bright's (Dr. J.) Synopsis of Diseases of the Chest, cr. 8vo. 6s. cl.
Chapman's (Dr. E.) Manual of Materia Medica, &c. 12mo. 8s. cl.
Christopher's Shipwrecks and Collisions at Sea, 8vo. 3s. 6d. cl.
Clans of the Highlands, ed. by S. Smibert, royal 8vo. 2l. 5s. cl.
Cumming's (R. G.) The Lion Hunter, 2nd ed. cr. 8vo. 1l. 4s. cl.
De Bury's (Baroness) Germania, its Courts, Camps, &c. 2 vols. 21s.
Gamester (The), a Tale of 1845, royal 12mo. 3s. cl.
Gleanings from Pious Authors, new ed. 12mo. 3s. cl.
Gray's (Mrs. H.) The Emperors of Rome, 12mo. 8s. cl.
Griesbach's Greek Testament, new ed. 12mo 6s. 6d. cl.
Guthrie's (Rev. W.) The Christian's Great Interest, new ed. 1s. cl.
Handel's Oratorio, 'Sampson,' ed. by Vincent Novello, 7s. 6d. cl.
Hiley's (R.) Arithmetical Companion, 3rd ed. 2s.; Key, 1s. 6d. cl.
Horace, Odes, Epodes, &c. translated by G. J. Whyte Melville, 7s.6d.
Huddleston's (Rev. A.) Sermons, 8vo. 10s. 6d. cl.
In Memoriam, 3rd ed. 12mo. 6s. cl.
Kaloolah, or Journeyings to the Djebel Kumri, new ed. 5s. cl.
Kenrick's (J.) Ancient Egypt under the Pharaohs, 2 vols. 1l. 10s. cl.
Langford's (A. J.) Religious Skepticism, cr. 8vo. 5s. cl.
Lee's (E.) The Baths of Rhenish Germany, cr. 8vo. 4s. cl.
Legge's (G.) Christianity in Harmony, cr. 8vo. 3s. 6d. cl.
Lizars's Scottish Tourist, 18th ed. 12mo. 8s. 6d. cl.
M'Cosh's (Rev. J.) Method of Divine Government, 2nd ed. 12s. cl.
Mills's (J.) Our County, a Novel, 3 vols. post 8vo. 1l. 11s. 6d. bds.
Oliphant's (G. H. H.) The Law of Pews in Churches and Chapels, 2s.
Rennie's (J.) Alphabet of Scientific Gardening, new ed. 12mo. 1s. 6d.
Smith's (Rev. Sydney) Elementary Moral Philosophy, 2nd ed. 12s.
Steward's (G.) Religion the Weal of the Church, 8vo. 6s. 6d. cl.
Wharton's (J. J.) Manual for Articled Clerks, 6th ed. 12s. 6d. cl.
White's (J.) System of English Grammar, 18mo. 1s. 6d. cl.

## SOME REFLECTIONS ON THE MISSION ASSIGNED TO THE HELLENES IN THE WORLD'S HISTORY.

By Dr. Waagen.

All who study the history of mankind with attention must be struck by the remark, that every nation which has attained any prominent place in that history by a high degree of spiritual cultivation, has also been intrusted with the fulfilment of a specific mission or office, through which it contributes its share to that general store of spiritual culture, the common stock of the human species, whereby alone the latter asserts its divine origin and strives towards a reunion with it.

Among these different functions, I will more closely examine that particular one which was allotted by the Deity to the Hellenic people. It consisted unquestionably in the revelation of Beauty in the closest alliance with Moral force—as we find the combination expressed in their own word καλλοκαγαθία,—and in the most complete realization possible, by means of those qualities, of a purely ideal element, as opposed to the merely useful in the common sense of the term.

In every fibre of their nature, Beauty of Form—in which they required that the effective and good should appear clothed—was felt to be so profound a necessity, that they required it not only in those mental productions whose peculiar province is the Beautiful,—in Art namely, with its various branches, as Poetry, Architecture, Sculpture and Painting,—but in those, also, which especially strive after cognition,—Science, with its several appearances, History, Philosophy and Physics. Nay, even in oral discourse, on strictly practical concerns, whether of the State or of individuals, the charm of beauty could not be dispensed with:—hence the high perfection of their oratory.

But this spiritual craving of the Hellenes for beauty of form could have been excited only by an uncommonly vivid sense, nor could have been gratified without a quite peculiar aptitude for the plastic developement of it; and, in fact, we know of no other nation endowed with both gifts so largely as they were. The earliest evidences of this inclination towards beauty of form appear in the religious lessons of Orpheus and Musæus; of which, indeed, no remains have come down to us,—but concerning which, at least, we certainly know that they were expounded in verse;—thus early appearing in an artistic form with tendencies towards Beauty. How early, too, the Hellenes had arrived at the developement of this beauty in speech, is proved by the high perfection of the hexameters of Homer, who lived a thousand years before our era; from which may be decisively inferred a longer previous use of that measure. We see the talent for beauty in plastic arts already showing itself above five hundred years before their entire perfection, in the admiration of beauty in individual men, and in the high estimation which it receives in the poems of Homer. In this respect,

there is a very characteristic passage in the 2nd canto of the 'Iliad,' where it is said of Nireus, in the catalogue of the ships:—

> Nireus of Syma with three vessels came;
> Nireus, Aglæa's offspring, whom she bore
> To Charopus the king; Nireus, in form,
> (The faultless son of Peleus sole exempt,)
> Fairest proportioned of the sons of Greece:
> But he was heartless, and his men were few.
> ('*Iliad*,' *II.* 778, *&c.—Cowper's Transl.*)

The Greek disposition is here strongly marked by the circumstance that, although he is allowed one element of the καλλοκαγαθιὰ, the highest aim of Hellenic endeavour, Beauty, namely, in the fullest measure,—there instantly follows the remark that he was wanting in the other element, αγαθιὰ, or excellence of character. Now, the reason why Achilles, by Homer and all the Greeks, was extolled as the principal hero, was, his possessing both these properties in the highest degree; on which account, too, Homer distinguishes him alone by the epithet αμυμων—*the faultless*. Still, how well the Greeks could nevertheless appreciate spiritual worth, even when quite destitute of beauty, there needs no more striking proof than the boundless reverence paid by the first men of his time to Socrates, the noblest and purest incorporation of αγαθιὰ,—although his exterior presented the harshest contrast to the so-called Grecian Ideal. As for the worship of Beauty peculiar to the Greeks, it might be further proved by many examples; of which, however, I will adduce only the following here. On the occasion of the Battle of Platæa, where the very existence of all Greece was at stake, Herodotus does not fail to notice that the Spartan Kakicrates was "the most beautiful of all in the Greek army," not of the Lacedæmonians alone, but of all the other Hellenes as well. In Æginus, an Achaian city, Pausanias tells us, where there was an image of Zeus in the age of boyhood, they used in ancient times always to choose for his priest the most beautiful stripling that could be found there.

In short, if ever a higher Providence overruled the spiritual faculties of a genial race, so as to bring them to entire developement by a marvellous co-operation of the most favourable conditions,—such was certainly the case with the Hellenes.

Greece, the western coast of Asia Minor, and its islands combined in the rarest degree all the conditions of site and climate of which any single one is itself deemed favourable to the progress of human culture. If we cast a comparative glance over all the countries of this globe, we shall seek in vain for any other so finely articulated, or which in so limited a compass contains in equal measure those contrasts of mountains, fruitful plains, and sea, which are best adapted to liberate and exalt the human soul. The sea and mountain air, too, makes the body robust and fresh; and the views from hill tops and over the waters sharpen the vision. These conditions also promote the most various exercise of the human activities,—the rearing of cattle, agriculture, merchandise, and seafaring. While the latitude of their soil permitted the Hellenes to raise the generous olive, the exhilarating grape,—and so favoured the growth of every kind of fruit that the whole strength of man was not exhausted in securing their produce,—the nature of the ground, often stony, and in many places but moderately fruitful, did at the same time call for strenuous industry, which kept them from sinking into languor.—The oppressive glow of the sun, too, except for a few months yearly, was mitigated by the cool breezes of the mountains.

These beneficent influences of Nature were met by a system of training which promoted the harmonious developement of body and mind to a degree unknown among any other people. The Greeks, by assigning the highest honours to the victors in the great national games, proved the value which they set on this part of education. Those exercises of wrestling, running, boxing, and leaping in the Palæstras, did not only quicken the senses, inure and supple the body of the athlete,—not only did the developement of the muscular and the reduction of the grosser and laxer parts of the frame make it beautiful;—beyond this, a joyful courage and quickness of spirits were infinitely heightened by the same process.

It must indeed be admitted that the indispensable condition which allowed every free Greek to enjoy more or less of the advantages of such an education was the universal existence throughout Greece of the institution—justly abhorred in our days—of slavery.

Now, the most important spiritual cause of the full expansion of the Hellenic genius for Art is to be sought in the fact, that with them (not as in India and Egypt Religion took possession of Art,) the Arts at a very early period, by means of their poets, Homer and Hesiod, already laid hold of Religion, and moulded it at will according to their peculiar genius. Thus Herodotus himself declares, that it was those Poets who gave the Hellenes their Divinities.

In the next place, we have to consider their magnificent conceptions of the civic and public celebrations of Religion and of the State:—together with the simplicity of their private life. This combination alone made it possible for so small a people, by no means overflowing with riches, to produce monuments of Art in such numbers and on so grand a scale as they did.

The attainment of perfection in the Arts was, further, marvellously aided by the contrasted qualities of the different branches of the Hellenic race: among which the Doric and Ionian, and, next to these, the nearest relation of the former, the Æolian, were the most generally and prominently distinguished. While we see the Dorians, whose principal site during the period of their highest developement was the rugged Peloponnesus, manly, vigorous, harsh, substantial, adhering with the utmost tenacity to their original dispositions and to those forms of Art which they had already wrought out,—the Ionians, on the contrary, chiefly occupying the coast of Asia Minor, under a mild climate, display a more soft, poetic, gracious and impressible nature. This difference appears the earliest and most immediately in the Doric and Ionic dialects; but it was afterwards visible in their respective performances in Art.

Finally, I have to notice some points in the history of the Hellenes as highly favourable to the developement of the Arts,—in which term I must in these remarks be understood as always including Poetry.

The moderate degree of cultivation, the patriarchal sway of a number of petty kings who ruled in Greece before, during, and after the Trojan War, formed the very soil in which Epic Poetry, as known to us in Homer, could best strike root with such inimitable perfection.

The subsequent rise of the many little republics, with their state of passionate excitement, kept up as well by rivalry with their neighbours as by the intestine party struggles of each, was not less favourable to the somewhat later lyrical poetry than the public spirit which they fostered was to the construction of the Acropolis, the Temple, and other public edifices.

Finally, the victory gained by extraordinary efforts over the domineering Persians, just at the time when Dramatic and Plastic Art were advancing towards perfection, gave to the national character an incalculable impulse, and prompted on all hands the expression of an ardent gratitude towards the protecting Divinities by the erection of Temples and Statues of the utmost attainable beauty and splendour.

Thus, aided by so many favouring circumstances, Grecian Art is seen to unfold itself in every branch, throughout the long period of six centuries, by a process so marvellously organic as was never witnessed in any other nation.

Among the Hellenes, as in all races, Poetry—that art which uses speech for its medium of representation—preceded the others. Here, the Ionians in Asia Minor, both favoured by conditions of climate and in virtue of their singularly poetic and plastic nature, head the procession. In the 11th century before our era, there already flourished among them a school of Poets which in the beginning of the 10th sent forth Homer. With him Epic Poetic, wherein the whole universe is mirrored in the contemplative soul of the poet as in a tranquil ocean, reached its highest perfection.

Whoever may have written the 'Works and Days' ascribed to Hesiod, the part of that poem containing ethical sentences is in any case a very notable proof of the early desire of the Greeks to impress a beautiful artistic form even on rules of this severe character. The conjecture that the author of the poem flourished some 800 years before our era, or about 200 after Homer, appears to me, from the strikingly different tone and composition of the former, to be very probable.

The beautiful artistic expression of the tempest of passion in the human soul stirred to its utmost depths, thrills us for the first time in the lyric poems which Alcæus and Sappho sang in the Œolic dialect, about 600 years before the Christian period.

Meanwhile, at some date between the ages of Hesiod and of these lyrists, Greek genius had begun to stamp its peculiar impress on that form of Art which subdues rude sensible matter to the aim of creating forms obeying the laws of a beauty dwelling in the conceptions of the human mind:—namely, on Architecture. How entirely its rules, whether of Harmony in its main relations or of the fit composition of its details, sprang from the Artistic Spirit common to *all the Hellenic* race, needs no stronger proof than the nearly simultaneous birth of the Doric and Ionic orders,—both of which possess those qualities in the highest degree, while respectively reflecting at the same time the peculiar mental complexion of each separate race;—so that, the strong and massive Doric has been not inaptly compared to the man,—the slender and more ornate Ionic order to the woman.

Thus, by the beginning of the 5th century before Christ, every thing was most happily prepared for the developement of Dramatic Poetry, for the highest productions both of Sculpture and of Painting; which in the course of two preceding centuries, by gradually possessing themselves of technical resources of all kinds, and by studies from Nature, had at length gained a full command of their proper means of representation. From Homer, presented anew in a complete body to the liveliest feelings of the nation, or the collection of his poems by the Pisistratidæ, the Dramatists gained the advantage of having merely to transfer figures at will from his epic composition—as from a bas-relief in sculpture—to the dramatic or wholly detached form; while the Lyrical Poets gave them a perfect model for the Chorus, whose office was to contemplate and comment on the destinies of these personages. In the same Homer and in other epic poets, now lost to us, the sculptors and painters found such fine and distinct sketches for the conception of their gods and heroes, that their imagination thus kindled soon discovered physical forms in harmony with the spiritual notion; and by the command already noticed of the technical materials of their respective Arts could completely embody them in practice. Finally, the forms of space to which they must apply their productions, the laws of style to be followed in fashioning them, were already most happily prescribed by Architecture, which by that time had arrived at its full developement.

As the consummation of these conditions, so marvellously conducive to the attainment of perfection, it was now ordained by the good genius of Greece that, after the Persian wars, not only did Athens, raised to the head of Grecian affairs, acquire the command of enlarged means,—but also that in the same Athens so magnificent a statesman as Pericles became the chief of the Government, and applied those means to the execution of the noblest monuments of Art. At this period the Athenians were impressed by influences from all of the different Grecian tribes; and thenceforward, resolved these into perfect harmony, unfolded the most consummate flowers of Hellenic cultivation. Derived from the Ionic stock, its soft, delicate, and sensitive temperament was in them improved by a tone of strength evoked by the necessity of strenuous labour on the unyielding soil of Attica. Nor did the Dorians, settled in great numbers around them, fail to exert a considerable influence over their Attic neighbours. Thus, the Athenians had borrowed from them the Doric order of architecture; but this, with the elegant taste of their race, they modified in so refined a manner, that the buildings erected in Athens in that style — the Parthenon, the Pro-

pylæ, the Temple of Theseus—are the finest specimens of this order extant. Thus, also, amongst them, the Ionic dialect, becoming more masculine, grew into that form termed the Attic:—but the Dramatists, in addition to this, following in the steps of Pindar, adopted for their chorus the Doric dialect,—the fuller and sterner mould of which admirably corresponded with the feeling of solemnity which prevails in these choral strains. As to Athenian sculpture in the age of Phidias, its genesis has only become thoroughly intelligible since the recent discovery of the Triumphal Monument at Xanthus, in Lycia. This monument, which, according to Sir Charles Fellows's luminous discussion, is certainly not later than about 500 years A.C., is in relation to the Ionic school of the same importance as the Æginetan statues are to the Doric. From it we learn firstly, that, in accordance with the nature of the Ionians, sculpture had reached with them, earlier than with the Dorians, the developement of a marked individuality in the forms of consummate art. We further see that this Ionic element plays a most important part in the sculptures of the Parthenon; and that their marvellous sublimity results from that practical mastery of hand and true representation of natural forms which we behold (the heads excepted) in the statues of Ægina, interpenetrated with the freedom, grace, and sensitive feeling which we recognize in the Tropæal monuments of Xanthus. The influence of the Ionic school on the Attic is above all most peculiarly apparent in the treatment of draperies.

To this artistic cultivation of the Athenians the words of Schiller are especially applicable.—

> For where the Stubborn weds the Supple,
> Where energy and softness couple,
> Then only rings the faultless tone.
>
> *Song of The Bell.*

In no other place or time on our globe have so many distinguished and highly trained intelligences existed within so short a period as Athens can exhibit during the interval between 480 and 380 A.C. Statesmen, generals, orators, historians, such as Herodotus, Thucydides, and Xenophon,—philosophers like Anaxagoras, Plato, Socrates,—dramatists, like Sophocles, Euripides, and Aristophanes,—artists, such as Ictinus, Mnesicles, Phidias, Polygnotus, Alcamenes, and Myron,—were chief jewels in this precious crown. Among such spirits as these, of whom most, as contemporaries, were in personal contact with each other, how vivid must have been the reciprocal action, both in urging each individual onward and in raising the general tone of all! To what heights of multiform intellectual cultivation must the human species in Athens have been elevated during that period!

Let us now especially contemplate for a moment the position of the architect and of the plastic artist in that age, so auspicious to the ascent of the highest point ever yet reached by human capacities. The kindness of nature had bestowed in abundance the noblest materials in the marbles of Pentelicus and Paros. Mining and commerce brought them brass, gold, and ivory. For models of the nude figure, the Palæstra afforded incomparable studies in the most beautifully trained bodies of all ages, from early youth to robust manhood, in varied and voluble motion. For draped figures, in every street, in every square, at rest and in every kind of movement, the richest store of subjects offered themselves to the artist in beautiful picturesque costume. His *general* mental education was admirably furthered by intercourse with men such as Sophocles and others of those already named. Finally, his moral self-respect could not fail to be infinitely raised in tone by the consciousness that the Hellenes bowed in reverence before the images of gods which he had fashioned; that it was he who bestowed on man the highest of known honours,—by the production of the iconic statue. A kindred feeling must in like manner have possessed the dramatists, when the noblest and richest men of Athens contested the honour of rehearsing the choruses of their plays, and of displaying them at enormous cost, with splendid costumes,—while the most select of the highly cultivated Greeks listened in rapture at the words which they had put into the mouths of their gods, heroes, and choruses.

Here, too, during this most flourishing epoch, Poetry still moves in advance of the plastic Art; and both again mutually reflect each other in their chief productions. The sublime Æschylus has his counterpart in Phidias, the sculptor of the lofty Zeus,—by whose image, as the ancients expressed it, he added a certain new dignity to religion,—an image which it was counted by any of the Hellenes a misfortune not to have seen once in their lives; the sculptor, too, of the grave and pensive Pallas:—and after Phidias, in Polycletus, the sculptor of the proud and majestic Juno. To the graceful and pathetic Sophocles corresponds Scopas, the sculptor of Niobe, and of the Venus (of Milos), the noblest conception of that goddess. The passionate, touching, and more sensual Euripides is reflected by the elegant and voluptuous Praxiteles, the sculptor of Venus as the ideal of amorous enchantment,—as also of the Eros.—But now, when with Lysippus, in his representation of Alexander, the plastic Art of the Hellenes gradually descended from gods and heroes to the most consummate exhibition of merely human forms, it kept its place, under Alexander's successors, even while in the service of domineering Rome, until the days of Hadrian, although in a slow decline, yet still at a considerable pitch of excellence:—and thus flourished, we may say, throughout a period of six centuries. This long continuance is, in my opinion, chiefly attributable to the delicate tact of the Greeks, which taught them to avoid deviating essentially from any Ideal which had once been embodied to perfection,—without falling the while into merely servile and spiritless copying. The most ingenious artists, indeed, well know how to make their own individuality sufficiently prominent, by an infinite variety of delicate modifications, while strictly adhering to the general character of their standard. In this very circumstance lies one of the most engaging attractions of Hellenic Art to its admirers. Hereby, at all events, the universal eagerness for works of plastic Art in those ages of Greek antiquity could be qualified in a manner at once becoming and complete,—so that, all the masterpieces of sculpture, on every scale, from the Colossus down to the smallest coin, and in every material, from gold and silver to baked clay and wood, as well as the finest works and designs of the great painters, were preserved in *innumerable* repetitions, from the decoration of earthenware vases to the fugitive wall painting of the humblest dwellings—even in such a petty town as Pompeii. To this last-named circumstance we owe the preservation to our days of so vast a treasure of the genuine inventions of Greek Art.

In conclusion, the individuality of Hellenic Art-genius resulting from the co-operation of so many fortunate conditions fostering its highest developement, consists—not only in works of poetry and architecture, but essentially also in those of sculpture and painting—in a union of the most original and the most beautiful invention, always completely exhausting the subject chosen,—in the most precise and natural delineation of character, with a measure of beauty of form the highest in degree which the latter will permit,—in a thoroughly simple and natural grace of action,—and in a strict regard of the laws of style respectively prescribed to each several branch of Art as well by the materials with which it deals as by its distribution in time and space.

## OUR WEEKLY GOSSIP.

On Wednesday last, the petition for a Finding Catalogue of the books in the Library of the British Museum which we printed last week was presented to the House of Commons by Mr. Wyld. The evil against which it protests is one that is becoming daily more and more grievously felt; and it is to be lamented that the extreme period of the session at which the impatience of parties injured was driven into utterance, necessarily limited the expression of that impatience to the mere form of protest. Before another session, however, we hope that the public will have bestirred themselves in such a manner as shall show the necessity of unlocking the public library with something more available for common use than a costly, complicated patent key, however curious as a piece of workmanship; and we trust they will then again claim the interference of their representatives — the Trustees for *them* of the British Museum—in such terms and numbers as shall insure their obtaining access to their own treasures by the easiest mode of ingress and from all parts of the kingdom.—The peculiarities of the Catalogue now preparing which unfit it for the people's pressing want, are—that it is for posterity only—of that posterity, for the London portion only—of that London posterity, for one man at a time only—of the men who shall then be entitled to use it singly at a time, suitable to the leisure and patience of probably one in ten only. The Catalogue wanted is one that men now living may consult in their own persons not in that of their heirs,—whether they be at Kirkwall or at Penzance,—and as many at once as may have need.

Last week we called attention to the plea that, it is said, will be set up by Mr. Murray in defence of his property in Mr. Washington Irving's works—namely, that the American author is not an alien. While the adoption of this course of argument narrows the ground of the dispute in this particular case, it will, if persevered in, be followed by some curious consequences, and bring out features of peculiar—we may say of dramatic—interest. Suppose that Washington Irving should be proved in a court of law to be no alien—no citizen of the United States, but a British subject, born to all the rights, dignities, privileges, and obligations expressed in that term. This is what the defence contemplates. In the first place, can a man be a native of two separate and sovereign States? If he be an Englishman, can he be an American? To establish the right of citizenship on one side the Atlantic, is it not to forego it on the other? If so, can Mr. Irving desire in his old age to forswear the land of his birth and of his early devotion—the State which has employed his genius in the discharge of its highest diplomatic functions? Spanish embassies are not confided to men of letters in the country which by the presumption he now seeks to make his own.—There is another curious consequence of the issue sought to be established. If Mr. Irving gains a right to hold literary property in England, will he not lose his claim to hold it in America? Which may be the greater loss we know not; but we fancy the holders of his copyrights in the States may object to have their property placed in jeopardy.—The final issue of a successful defence on the plea now put forward may be more curious still—and far graver. Mr. Irving has served his country in peace and in war. In the latter service he has borne arms against Britain. Should his friends prove him to have been a British subject at the time, he is, of course, a rebel,—and is liable to be taken from Westminster Hall to a court-martial, and ordered to be shot!

At the meeting on Thursday of Her Majesty's Commissioners for the Exhibition of 1851, it was decided that the last day for receiving demands for space in the building from local committees in the United Kingdom and the Channel Islands should be the 31st of October. Parties failing to give such notice as their nearest local committee may require, cannot be assured that their claims for space will receive any consideration.

We observe that the Peace Society have taken up their ink-stand—as Luther did in his conflict with the devil—against war and its atrocities in a formal and imposing manner. Hitherto, the especial literature of the Peace Movement, so far as it has come under our notice, has been weak and inefficient—wanting in the elements of vigorous thought and graceful expression, absolutely needed to command popular attention in these times. The new organ of the movement—*The Herald of Peace*—promises to be better than its predecessors; but the tone, we fear, is not lucid enough to catch the ear of the masses. This may be amended as the writers come more and more to perceive the necessity of employing human means to bring about a human end. The arguments in favour of peace are of every rational kind,—and they are needlessly narrowed when they are addressed to those only who entertain strong religious views.

A termination of the late dispute about the Lincoln Grammar School has been arrived at. The

school has been given up, by a majority of the town council in the city, to the Dean and Chapter, to be dealt with as they shall see fit.—There is sufficient amount of precedent before the world to suggest what will become of this educational endowment under its new masters. Under careful civil management, this school might have been rendered the means of giving useful training to a considerable number of the rising generation of Lincoln. As it is to be, the foundation becomes an exclusive and sectarian institution for the benefit of a few children who have no better legal claim on its provisions than the sons of every inhabitant of the city.—Every case of this kind which comes before the public strengthens the demand for a searching Parliamentary inquiry.

It may save annoyance to some of our readers who are intending tourists at this season of Continental touring, if we state, on the authority of the Belgian Consul—who has addressed us to that effect,—that a statement which has appeared in some of the English papers affirming the suppression of the passport system in Belgium is incorrect. Belgium has yet the merit of retaining in full force that senseless and oppressive restriction,—which, in addition to its other qualities of absurdity, has the peculiar absurdity of being a strongly expressed anachronism in an age when the iron horse is riding down all the barriers that separated nations and in a sense annihilating the space that lay between them. Nations which have got the lightning for a messenger might seem to have done with the passport police; but it is well that our readers—who would have been extremely likely to believe the newspaper paragraph on the ground of its inherent rationality—should be warned that, like a sovereign of England entering the city of London, they must still go through this idle form of knocking at the gates in the kingdom of Belgium.

In spite of political excitement it is gratifying to see that the true principles of social reform are making their way in France. The President of the Republic has caused to be translated Mr. Roberts's plans for improving the dwellings of the labouring classes,—and copies of the work have been sent by the Minister of Agriculture and Commerce to the prefects of all the departments. Several papers in Paris have recently given up some of their space to a discussion of these practicable reforms. The *Moniteur* quotes from Mr. Dixon's recent Life of Howard the example of Cardington, and the changes effected there by an earnest man who set about his work in a wise and humane spirit; and holds up the English philanthropist as the model for the youth of France to imitate. The mere discussion of such topics may be welcomed as a sign of returning health in the country.

A letter from Ratisbon states, that the Museum of the Zoological and Mineralogical Society of that town has made a curious acquisition,—that of two mummies found in the sands of the desert of Atacama in Upper Peru, by Dr. Ried, a Bavarian physician resident at Valparaiso. These mummies, male and female, both of American race, are natural mummies,—that is to say, dried without embalming or any other species of preparation. The man is in a stooping posture, his head sustained on his hands, and his elbows resting on his knees. The face has an expression of pain which seems to indicate a violent death. The woman is stretched at length, with arms crossed on her breast. Both heads are covered with long hair, dark and silky, and divided into an infinity of small plaits. When Dr. Ried discovered these mummies both had their teeth complete; but during their transport to Europe many of these have fallen out, and were found at the bottom of the cases containing these curious relics of American antiquity.

Our readers know that we have great fears of the American penny-a-liner, and are carefully on our guard against his feats. Our own specimens of the class are commonplace artists compared with their American brethren. The season is at hand when we are looking out for the performances of the former,—but we expect little from them beyond the old routine. In their sluggish imaginations, the annual pike is doubtless already growing up to his great dimensions, which, on failure of the accustomed springs of intelligence, we are soon to find floating in the newspaper shallows,—and the preposterous cucumber is probably having an inch added to its stature, which will shortly shoot rankly up where the parliamentary harvest has been cut down. The most daring thing that we can expect from these geniuses is, a trick or two perhaps with the Nelson Column.—But the American penny-a-liner, our readers know, does the thing on the vast scale of his country. He takes down Niagara at his pleasure,—and puts it up again, in its place or anywhere else that he will. He transports the great Falls about the soil of his country at half a crown an adventure,—and for five shillings would probably set them playing in the moon. We have thought it necessary to make these remarks by way of preface to the following extract from the *Buffalo Courier*.—"The falling of Table Rock at Niagara Falls, on Saturday last, was an event which has been prognosticated from time immemorial, though the precise period at which the affair would 'come off' was not designated. The portion that fell was from one hundred and fifty to two hundred feet long, and from thirty to seventy feet broad, making an irregular semi-circle, the general conformation of which is probably well remembered by those who have been on the spot. It was the favourite point for observation. The noise occasioned by the crash was heard at the distance of at least three miles, though many in the village on the American side heard nothing of it. It is a very fortunate circumstance that the event took place just at dinner time, when most of the visitors were at the hotels. No lives were lost. A carriage from which the horses had been detached stood upon the rock, and a boy was seated inside. He felt the rock giving way, and had barely time to get out and rush to the edge that did not fall before, the whole immense mass was precipitated into the chasm below. A gentleman and a lady, accompanied by the guide, had quite a narrow escape from below. They were passing under the rock at the time it commenced falling, but were so fortunate as to escape without the slightest injury."—Our readers have the passage as we find it,—and we offer no opinion on its credit one way or the other. We are very sensitive about these Falls. We were once seriously tricked by them; and the parties have "tried it on" once or twice since,—we are happy to say, without success. The carriage with the boy inside, who leaped out when the rock was falling, and lighted just where the rock did *not* fall—and the lady and gentleman who were under the rock as it fell, and escaped unhurt—belong to a "Roman hand" extremely well known to us.—We shall not be surprised to find the rock "restored" in a future number of the *Buffalo Courier*.

*Closing of the Exhibition.*

The EXHIBITION of PICTURES by ANCIENT MASTERS and deceased BRITISH ARTISTS at the GALLERY of the BRITISH INSTITUTION, 52, Pall Mall, is OPEN daily from Ten to Six, and will CLOSE on SATURDAY, AUGUST 31.—Admission, 1s. Catalogue, 1s. GEORGE NICOL, Secretary.

The DARDANELLES, CONSTANTINOPLE, and the BOSPHORUS.—By this gigantic MOVING PANORAMA, the spectator is conducted through the far-famed CITY of the SULTAN, and, among all that is singular and interesting in that classic region, will visit the Mosques, Bazaars, Baths, Slave-Market, Seraglio, and Harem.—Daily at Twelve, Three, and Eight o'clock, at the POLYORAMA, 309, Regent Street, adjoining the Polytechnic Institution.—Admission, 1s.; Stalls, 2s. 6d.; Reserved Seats, 3s.

PANORAMA of the NILE.—Additions have been made to this Exhibition.—The Nubian Desert, from the Second Cataract to Dongola.—War Dance by Firelight.—March of Caravan by Moonlight.—Morning Prayer.—The Mummy of a High Priest is added to the curiosities. Both Banks of the River are shown in the Painting.—EGYPTIAN HALL, PICCADILLY.—Daily, at Three, and Eight o'clock.—Stalls, 3s., Pit, 2s., Gallery, 1s.; Children and Schools, Half-price.

INDIA OVERLAND MAIL.—DIORAMA.—GALLERY of ILLUSTRATION, 14, Regent-street, Waterloo-place.—Additional Picture, MADRAS.—A Gigantic MOVING DIORAMA, ILLUSTRATING the ROUTE of the OVERLAND MAIL to INDIA, depicting every object worthy of notice on this highly-interesting journey from Southampton to Madras and Calcutta, accompanied by descriptive detail and appropriate music, is now OPEN DAILY, Mornings at Twelve, Afternoons at Three, and in the Evening at Eight o'clock.—Admission, 1s.; Stalls, 2s. 6d.; Reserved Seats, 3s.—Doors open half an hour before each representation.

The DIORAMA, Regent's Park.—Admission, One Shilling—NOW OPEN, with the finest VIEWS ever exhibited in this country, representing the ROYAL CASTLE of STOLZENFELS, on the Rhine, (visited by Her Majesty Queen Victoria in August, 1845,) and its Environs, as seen at Sunset and during a Thunder Storm; painted by NICHOLAS MEISTER, of Cologne.—And the much-admired Picture of THE SHRINE OF THE NATIVITY, at Bethlehem; painted by the late M. RENOUX, from a Sketch made on the spot by DAVID ROBERTS, Esq. R.A., with novel and striking effects.—Open from Ten till Six.

The ARCHITECTURAL EXHIBITION, at the GALLERY, 53, Pall Mall, is NOW OPEN to the Public FREE, except on Saturdays, the admission then being One Shilling.

GEORGE TRUEFITT, JAMES K. COLLING, } Hon. Secs.

ROYAL POLYTECHNIC INSTITUTION.

During this week the ALPINE SINGERS from Styria will perform several of their National Melodies, Daily at Four, and in the Evenings at Half-past Eight.—LECTURE on CHEMISTRY, by J. H. Pepper, Esq., daily at a Quarter-past Three, and in the Evening at Eight, ILLUSTRATING the ANCIENT FIERY ORDEAL, and the HANDLING of RED-HOT METALS.—LECTURE by DR. BACHHOFFNER on VOLTAIC ELECTRICITY, daily at Two, and in the Evenings at a Quarter-past Nine.—NEW SERIES of DISSOLVING VIEWS, illustrating some of the WONDERS of NATURE, daily at Half-past Four, and in the Evenings at a Quarter to Ten; also a Series, exhibiting SCENES in the ARCTIC REGIONS and CEYLON, daily at One o'clock.—DIVER and DIVING BELL, &c. &c.—Admission, 1s.; Schools, Half-price.

## FINE ARTS

FINE-ART GOSSIP.—We have already spoken of the large sums raising all over the country for monuments to Sir Robert Peel,—and remember no case in our time of a demonstration so eminently national. It is fitting, of course, that the most remarkable expression of this universal sentiment should be in the metropolis; and if the monument to be there erected does justice to the greatness which it is designed to commemorate, we shall have a work of which the country may be proud. In order that this may be the case, it is more than ordinarily important that the spirit of jobbery—a familiar at too many of our great works—shall be forbidden to approach the Peel testimonial. Now, a letter which appeared some days since in the *Times* is calculated to arouse—and, we hope, *will* arouse—suspicion. It is there announced that, in reply to a question of Mr. C. B. Wall, Lord John Russell stated that the principle of competition is not to be applied to this work. He affirmed that the sculptor was not *yet* selected,—but that "*his wish* was, that it should be in the hands of some artist acquainted with the lineaments of Sir Robert Peel." With the copious precedents which we have as interpreters of such language as this, it is impossible to escape the impression that a particular artist is intended to be here predesignated. This assignment of a minute and especial qualification beforehand has a most suspicious look. We beg to inform Lord John Russell that the likeness of Sir Robert Peel is but *one* incident of such a monument as should express the national grief and the national estimation in the first city of the empire,—and, moreover, that there is sufficient general acquaintance with the features of Sir Robert Peel amongst *all* the sculptors of the metropolis, and abundant materials out of which to refresh their memories, to make *any* of them competent to execute the work on that minor score. There is no difficulty whatever in preserving faithfully and ably the lineaments of Sir Robert, either in marble or in bronze. The portrait at Drayton by Sir Thomas Lawrence and the bust by Chantrey in the possession of the Earl of Aberdeen are the two best likenesses of the deceased statesman, and the two particular representations of him on which his portrait-statue should be founded.—All this is so obvious—the particular laying down of Lord John's qualification has so little general propriety, that it is difficult not to apply it to a personality. That Sir Robert Peel sat to this artist or to that should not be made the ground of claim for his having the work assigned to him. If a work of art be wanted, let the monument be given to the sculptor who produces the finest model,—if likeness only is wanted, the modeller at Madame Tussaud's may serve the turn. We have three very fine portrait statues in this country: Sir Isaac Newton, by Roubiliac, at Trinity College, Cambridge,—the great Lord Mansfield, by Flaxman, in Westminster Abbey,—and Cyril Jackson, by Chantrey, in Christ Church, Oxford. The Newton was composed from pictures by Kneller and Jervas, and from a cast after death; the Mansfield was composed from the picture by Sir Joshua Reynolds; and the Cyril Jackson from a picture (we believe by Owen) and from an indifferent cast after death.—Let us be careful that we do not throw away the sum which we have voted (5,250*l.*) on a work of art that will justify the observation

of the great foreign sculptor now amongst us for the first time,—that here in England we waste unparalleled execution in marble in carrying out the commonest combinations of the fancy.—Lord John Russell should be told that the public are very weary of arbitrary appropriations,—and of the sort of results that have come of them; and there never was a case of the kind in which they have been more disposed to resent a narrow dictation than they will be in this. Out of a universal sympathy, as we have said, comes the demand that calls this art into exercise,—and the public have a right to the very best art that competition can produce. The nation is entitled to choose its own sculptor this time if ever it was. To make the monumental expression of its deep and spontaneous feeling a piece of private patronage, is an insult to the feeling itself.—Neither if this were not so, can we afford to intrust Lord John Russell with the farming of the public taste.—We hope the matter will be jealously watched,—and that a wide and generous impulse will not be allowed to feed a "job."

A curious example of the unfitness of the present locality for the preservation of the national collection of pictures may be found on the threshold of the building itself. It is only seven years since there was placed in the hall of the National Gallery the subscription statue of the late Sir David Wilkie. It was executed by the late Mr. Samuel Joseph out of a block of the purest white marble,—but the colour is already strangely changed. By its rapid discolouration a test is supplied of the amount of injury to which the surfaces of the pictures in the same building have been subjected during the same short interval. The statue has become a sort of dirt-ometer. There is scarcely any ancient statue in the Townley, Elgin or other collections in the British Museum of deeper or dirtier tone than it has in so short a time acquired.

The following Returns in connexion with the School of Design have been moved for by Mr. Milner Gibson, and granted.—Papers in continuation of the Report on the School of Design made in 1849. Copies of all Reports on the state of the Head or Provincial Schools made to the Board of Trade since August 1849. Return of all the Appointments of Masters and otherwise to the Head School and Provincial Schools since August 1849. Copy of any Minutes of the Board of Trade affecting the Management of the School passed since August 1849. Return of the Subscriptions and Donations to the Provincial Schools in the year 1849, and the amount of the debts or liabilities (if any) of each School. A Return of all Expenses incurred in the inspection of the Provincial Schools, the number of the inspections made in each school, the date when made, and the period over which the inspection lasted.

Among recent votes of the House of Commons is one of 11,000*l.* for taking down and putting up again the Marble Arch—that great Government puzzle,—and for iron railings in front of the Palace. What he is to do with the Arch, the Chancellor of the Exchequer confesses to be a problem beyond his philosophy.

The increasing taste for Fine Art is manifesting itself in many ways. To the Kembles has been ascribed the merit of having improved everything that pertains to the mounting of dramatic representations,—and Mr. Macready and others have contributed to carry out the new dramatic feature which they introduced. With our present improved knowledge of costume, we should be little inclined to see Macbeth presented as in the days of Garrick, when he and Mrs. Pritchard enacted the principal parts in the bag-wig and hoops which were the court costume of the time. There have been recently no more conspicuous examples of this improved accessorial illustration than were presented in the two operas which have of late had such success at Covent Garden Theatre,—'The Prophet' and 'The Jewess.' The scene in Münster Cathedral after the coronation of the Prophet, when he presents himself to the populace, is gorgeous in the extreme. The tableau has been arranged with the eye of a painter, and every element of especial truth has been enlisted to conduce to the look of general probability. Every appointment of costume is consistent,—the scenery is well devised,—and the grouping is so managed as to make picturesque and agreeable combinations.—In 'The Jewess,' the exterior of the cathedral, with the ingress and egress of the populace,—the splendid cavalcade which traversing the stage subsides under the archway of a stately gate,—the well-ordered banquet scene,—and the closing one where the heroine is led to her execution,—are all examples of a mastery of direction, which speaks highly for the party intrusted with these gettings-up.

Mr. Rock has written to the *Builder* to say what is intended to be done in the way of repair at the beautiful ruin of St. Stephen's Church, Walbrook, To do all that is desirable, he says, "would entail buying and removing the house attached to its tower, chipping off its unsightly stucco and working down to the original stone, or possibly refacing it from the ground to the balustres. The committee have not, however, found out the way of making 1,000*l.* do the work of 5,000*l.* They have, consequently, decided on doing to the exterior only what is necessary for due preservation; and they hope the remainder of the sum at their disposal will enable them to restore the interior to its best appearance in its best days. To direct them in this, they have visited most of the churches of Sir Christopher's erection, and have unanimously agreed that every attempt (and they have been many) to alter his original work or to add to his original embellishment has signally failed. They have consequently determined not vainly to try to improve the beautiful building confided to their care, but they will endeavour to restore and repair it."

The sale of the pictures forming the gallery of the late King of Holland commenced at the Hague on Monday last. The interest attaching to the dispersion of this great collection has filled the Dutch capital with visitors, and the palace has been crowded during the period of the public view. The sale takes place in the great hall of the palace,—which a contemporary describes as a noble Gothic room of 80 feet long and about 40 feet wide, with a lofty roof of carved oak. All the distinguished amateurs and collectors of Europe are said to be present; and our own Correspondent informs us that agents are there from every Government excepting England. We give a few of the prices obtained at the first day's sale, in florins, with the names of some of the purchasers:—premising that 1,000 florins, with the 7½ per cent., may be reckoned as 100*l.* sterling.—*Dutch School:* B. Van der Helst, a noble gallery picture, a family party in a garden, with falcon, dogs, &c., 11,900 florins: M. Bruni, believed to be for the Emperor of Russia.—Rembrandt, Portrait of a Rabbi, with cap and black robe trimmed with ermine, very fine, 3,400 florins: M. Weimar.—Same, Artist's own Portrait, 3,750 florins: M. Niewenhuys.—Same, Portrait of a Young Lady, in handsome costume, 7,000 florins: M. Leroy, for the National Gallery at Brussels.—Same, Portrait of Rembrandt's Son, 4,000 florins.—Same, the Owner of the Vineyard paying his Labourers, a noble composition, 4,000 florins: Dr. Van Cleef.—Same, a figure of a Vizir in rich oriental costume, a splendid picture, 4,500 florins: M. Niewenhuys.—Wouvermans, 'St Hubert,' 3,000 florins: M. Niewenhuys, for the Musée.—J. and A. Both, a fine Italian Landscape, with figures, &c., 10,400 florins, bought for the National Gallery at Brussels.—Ruysdael and A. Van de Velde, a superb Landscape, with water, figures, cattle, &c., 12,900 florins, also for the National Gallery at Brussels.—W. Van de Velde, a Fleet in a Calm, a warm and splendid scene, 2,500 florins.—Backhuysen, Marine View, vessels in a storm, a very fine picture, 5,650 florins.—Jan Steen, Interior of a Dwelling, with a festive party, a fine composition, 3,000 florins.—J. Van Huysum, a Vase, containing a beautiful collection of flowers, 3,000 florins: M. Niewenhuys.—Weenix, a Dog and Dead Game; a very fine picture, 3,300 florins: M. Schurner.—*Old Flemish School:* Lambert Lombard, a Vision, in which appears the Archangel Michael in the rich costume of a warrior, and three other angels, one carrying the sword of Divine Justice; very curious, and well preserved, 1,900 florins.—Same, another curious old Picture, with splendid colouring, 1,850 florins.—Martin Schoon, a beautiful and highly finished small picture, representing the Death of the Virgin, surrounded by the Twelve Apostles, 2,950 florins: M. Niewenhuys.—Michel Coxie, after Van Eyck, Six fine copies, made for Philip II. King of Spain, 2,400 florins.—*German School:* Albert Dürer, a beautiful little composition, 'St. Hubert,' kneeling before the miraculous Stag, 3,800 florins.—*French School:* Claude de Lorraine, a Seaport on the coast of the Mediterranean, with many vessels, figures, &c.: a very fine picture, 8,600 florins.—Attributed to the Same, Rejoicings on the Marriage of Isaac with Rebecca; a splendid landscape, with lake, figures finely grouped, &c., 2,500 florins.—Attributed to the Same, 'The Departure of the Queen of Saba;' companion picture, and rivalling it in richness and beauty, 2,500 florins.

The *Brussells Herald* states that the artistic value of the works of Art contained in the churches of Antwerp, eleven in number, is by the late financial report of the province estimated at 49,763,000f., —nearly two millions of English money.

A fatality seems to attend the statues of the American sculptor Hiram Powers. It is only a few months since we had to announce the accident which befel his 'Eve,'—wrecked at Carthagena in the vessel which was conveying it to America. A similar fate has now overtaken his statue of the late Mr. Calhoun,—said by the American papers to have cost the artist years of toil, and which had been anxiously expected in his native country. On the 7th of April, Mr. Powers wrote from Florence that the statue had been encased for shipment,—and congratulated himself that it was not ready to be put on board the Swedish ship Westmoreland, in which his statue of 'Eve' was shipped!—Some hopes are expressed that the statue may be recovered.

## MUSIC AND THE DRAMA

Her Majesty's Theatre.—It is impossible to ignore the triumphant inroads of late years made and making by the English *prima donna* into the opera-houses of Europe. Successively have Miss Kemble, Mrs. Shaw, Miss Novello, Madame Thillon, Miss Hayes, Miss Bassano, (not to vouch for a score of Ladies with whose perfections we are unacquainted save through the questionable channels of common fame) made good their country's claims in Italy, Germany, and France,—and here is a new aspirant to *Norma's* wreath and to *Donna Anna's* mask and mourning, who after only a few months of Continental practice, has not feared to adventure herself on boards no less worshipful than those over which Mdlle. Lind and Madame Sontag lately reigned,—the stage of *Her Majesty's Theatre*. Neither was Mdlle. Lind on her first appearance nor Madame Sontag on her return greeted with more signs of triumph, welcome, and approval than cheered Madame Fiorentini when on Tuesday last she appeared in 'Norma.'—She is very handsome; and her voice is a legitimate *soprano*, the upper octave of which from c to c is of the finest possible quality—true, sonorous, powerful. The lower part of the register is weaker.—Madame Fiorentini has appeared two years too soon on our, if not on any, stage: since neither declamation nor execution are perfected. Her voice has not undergone the training which it required, and her style is more ambitious than expressive. This may sound strange in the ears of the Lady and her friends after the tumultuous raptures excited by her singing on Tuesday; but though strange, it is true—true after the largest possible allowance has been made for the terrors of a first appearance and the inexperience of one to whom her profession is new; and we are better friends in now stating the fact plainly than those who assure Madame Fiorentini that her Tuesday's position, with her present amount of accomplishment, is tenable.—It rests with herself, where she will ultimately take her place:—with such a voice as hers, that place ought to be in the very first rank of vocalists.

Haymarket.—A new farce was produced here on Monday, entitled 'The Hippopotamus:'—a

zoological extravaganza, not exactly to the taste of the audience at this theatre. It is enacted by the Adelphi company,—and may fare better when transferred to its proper stage. As usual, Mr. Wright and Mr. Bedford are the persons suited with parts, contrasted in size and vigour. Mr. Wright is a ham-and-beef shop proprietor, named *Tiddywink*, and Mr. Bedford is a "colossal life-guardsman," called *Serjeant Bulbous*. The unwieldy wonder of the Regent's Park is represented on the stage, in contact with the lion of the Gardens; and the ignoble brute succumbs at once to the menacing attitude of his more valiant opponent. This *dénouement* is led up to by Mr. Tiddywink going in chase of his wife, who is perpetually absent from her duties on the plea of seeing the Hippopotamus; and who enacts a scene of flirtation with Bulbous in order to punish her husband for his suspicions.—Mr. Wright was very droll,—and to him the piece was indebted for the small degree of success which it met with.

STRAND.—A new farce, by Mr. Simpson, under the title of 'Without Incumbrances,' was produced here on Monday. The plot turns on the temporary perplexities of one *Paul Pitapat* (Mr. Compton), ci-devant usher of Homer House Academy, in search of a situation. He replies to the advertisement of *Lady Buckram* (Mrs. B. Bartlett), the intending foundress of an infant school, for which she wants "a master of high moral principle, firm discipline, and without incumbrance." On his arrival at the neighbouring inn the worthy pedant finds an *imbroglio* commenced, of which he presently becomes the central point. The only incumbrance which he possesses on his appearance is a carpet-bag; but he soon has palmed on him the wife of one traveller and the eloped lady of another—the latter in male attire,—by whom he is claimed as husband and father. This for a while destroys every hope which he had of Lady Buckram's situation, and Paul is reduced to a state of ludicrous distress. The parties to this hoax are, *Mr. Dunbrown Stagge* (Mr. Shalders) with *Mrs. Stagge* (Miss Isabel Adams), and *Mr. Fred. Buckram* (Mr. W. Farren, Jun.) with *Miss Frances Sniffe* (Miss Adams). The latter lady is pursued by old Mr. Sniffe, her father, and a director of the "West Diddlesex Junction," now defunct,—but the capital stock of which Mr. Stagge has secured and seeks to carry off to Folkestone. There is a contest for the only chaise in the inn. Amidst an infinite deal of bustle, all matters get finally arranged; and Paul obtains the desired preceptorship of the proposed educational establishment. Mr. Compton bestowed on this character great richness of colouring. The piece itself possesses unusual merits.

SURREY.—'Tricks and Trials' is the title of a new piece produced here. It proposes to give a picture of "Life as we find it in 1850." All in a drama of the kind must be expected to be of the *ad captandum* order; and the attempt in the present one is to instruct the pit in the various "dodges" of the time. There are *Bob Shuffle* (Mr. H. Widdicomb), *Macgregor Peter* (Mr. Bruce Norton), and *Timothy Bricks* (Mr. W. Collier),—who are charged with illustrating the different possible means of getting on in the metropolis without money or character. Bob from selling penny rings becomes the Director of a public company; and he and Tim at last make advantageous matrimonial engagements. The three worthies at the fall of the curtain appear at Vauxhall Gardens in a *bal masqué* as the Nepaulese Princes. From these specimens the reader may judge of the stuff of which the drama is composed. It is amusing, and was thoroughly successful;—being placed on the stage with considerable care in respect of costumes and scenery.

MUSICAL AND DRAMATIC GOSSIP.—It is announced that the gains on the eight Philharmonic Concerts of the series have been no less than 350*l*. This is somewhere about 200*l*. too much. The expenditure of 125*l*. (say) in commissions, and the application of the remaining 75*l*. to the amending of the *solo* engagements and the introduction of vocalists less inferior than Madame Nottes and Madame Maillard, would have been only an honourable and worthy acknowledgment of public patronage and an artistic liberality towards artists. Ere another season sets in, there is ample time for the Philharmonic Directors rightly to lay out some portion of their accumulations. It would be easy to particularize the direction which might wisely be taken were we not anxious for progress. The managing powers of 1850, it is said, resolute to maintain their independence, and to rise superior to press-dictation, were determined, on principle, to resist every measure of amelioration recommended to them in print. No line of conduct is so easy, besides being so "spirit-ful and victorious," as that of a perpetual "*no*." Hence, having the cause of good music more at heart than the vindication of our own individual sagacity, we will not destroy the chance of a single enterprising step being taken by offering hint, counsel, or specification. Perhaps already too much has been here said for Philharmonic independence to digest,—in the above simple expression of our hope that the season under the Directors for 1851 may be better than it was under the Directors for 1850. Let us entreat that in retaliation for so bold a wish we may not be put back to Vanhall, Hullmandel, and Boccherini.

The day before yesterday a new organ, built by Messrs. Bishop, was opened at Lee, Blackheath, by Dr. Wesley. It is vexatious to have been prevented from enjoying the rare treat of good organ-playing by the shortness of the notice, which did not arrive till too late for it to be profited by.

A correspondent, who dates from the Athenæum, asks, what no one, we suspect, at these early days, can answer. *Contralti* are, of all musical stars, the greatest wanderers—in part because, now-a-days, they seem never contented to remain within their own orbit of voice. For the winter season, Mdlle. Alboni is said to be going to Madrid, and Mdlle. Angri to Vienna. These, however, are the merest rumours.—We are told that Miss C. Hayes has signed an engagement to winter in Rome—that Herr Formes has taken service in Spain—that Mr. Sims Reeves will sing at the Italian Opera in Paris.—Madame Taccani, a *prima donna* with a small flexible voice, who sang in Paris before Madame Persiani, and who disappeared from the opera-houses in consequence of marriage, has just followed the way of "all and sundry" married *prime donne*, by returning to the stage for a campaign during what may be called her "Indian summer."

A contemporary states that Mr. E. Loder is about to bring out an Opera of his composition at Brunswick.

Musical and dramatic ceremonies in inauguration of the statue of Herder will take place at Weimar towards the close of this month. On the 24th will be represented at the theatre the 'Prometheus Unbound,' with overture and choruses by M. Liszt. On the 25th, after the inauguration of the statue, Handel's 'Messiah' will be performed in the Cathedral, where Herder used to preach, and where he lies buried. On the 28th will be given at the theatre the first representation of 'Lohengrin,' a new opera, by Herr Wagner, with a prologue written for the occasion by Herr Dingelstedt.—Weimar is now accessible by railway from Ostend.

## MISCELLANEA

*Sunday Postage.*—The Commissioners have reported in favour of restoring a delivery of letters and newspapers on Sunday; and have offered various suggestions for the mitigation of the slight amount of Sunday labour in the Post-Office, so that every opportunity may be afforded to postmasters and their assistants of attending Divine worship on alternate Sundays.

To CORRESPONDENTS.—C. De la P.—Sylvanus—U. S.—A Spectator—received.

W. W.—The argument of our correspondent being based on the theory of the emission of luminous particles—which has not stood the test of examination,—does not at all improve our conception of the *flexion of light*.

J. W. R.—To this correspondent,—who writes to us on the subject of Peat Charcoal,—we will reply when the conclusion of our report of the proceedings of the British Association shall leave us more at leisure to deal with subjects of its class.

## TWENTIETH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

*[From our own Correspondents.]*

### MONDAY.

### SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

'Report of the Committee on the Instruments for the Measurement of Earthquake Waves.'—Mr. MALLET reported provisionally that the Committee had examined one branch of the subject with the aid of the new seismometer, and had arrived at unexpected and important results. This branch was the effect of concussions propagated through beds of sand, earth, &c. They proposed communicating these results in a full report as soon as they had examined the transmissions of concussions through rocks. The former concussions they had produced by exploding gunpowder,—these they proposed producing by the blow of a heavy mass of matter descending on the rock.

'Report of the Meteorology of the Azores,' by Mr. J. C. HUNT, communicated by Col. Reid.—Three barometers and thermometers were sent to the Azores through Col. Reid at the expense of the British Association, and placed in charge of Mr. Hunt. Two of them had been forwarded to the Vice-Consuls at Flores and Fayal; and the third reserved for the Vice-Consul at Terceira. The Table of Meteorological Observations which accompanied the Report was the result of a year's observations at St. Michael's, and was interesting as we have so few from the Atlantic Islands. It contained for each month the maximum, minimum, and mean of the barometer, thermometer, hygrometer, rain in inches, evaporative strength and direction of the winds and state of the weather, besides being reduced to means for the summer half year, winter half year, and whole year.

Dr. MARTINS addressed the meeting in French 'On the Six Climates of France.' He commenced by stating that France partook of the climates both of continental and sea-girt countries. He wished at present to consider six climatoreal subdivisions, viz.—1. The North-east or Vosgien—2. The North-west or Séquanien—3. That of the West or Armoricain—4. The South-west or Girondin—5. The South-east or Rhodanien—6, and finally, the Mediterranean or Provençal climate. Upon each of these subdivisions he enlarged; detailing the features of the country, the rivers, mountain-ranges, sea-coasts, geological structure, differences of level, and state of cultivation in each case, with the prevailing and most important features in the actual climate of each. Dr. Martins exhibited a map of France with these six regions distinguished. He stated that hitherto the labours of the Meteorologists of France had no channel of publicity at their command, but that a journal devoted exclusively to Meteorology was about to be established.

Mr. RONALDS inquired whether the state of the dew point had been attended to in this classification, as in his opinion that was one very important element.—Dr. MARTINS replied that it had been carefully attended to.—The ASTRONOMER ROYAL inquired whether the difference of climate during the day and during the night, that of the summer as distinguished from the winter had been attended to, as his experience led him to know that most important distinctions existed between these.—Mr. R. RUSSELL added his testimony to the same effect; and said, that in an agricultural point of view mean temperatures were not so important as was usually supposed. Along the west coast it was now found that the maximum for the summer or ripening portion of the year was of much greater importance to the agriculturist than the mean.—Sir D. BREWSTER said that means were not to be neglected, for it had been well established that unless the mean rose in the season that might be characterized as the vegetating season to at least 58°, it was not found to be favourable; but of course he did not mean to say that the rising of the mean of the hot season above this, or the falling of the cold much below it, were not important and to be attended to.

Dr. LEE made a communication on the Meteorological Registry kept at Alten and Christiania—and some Observations on the British Meteorological Society.

'Report of a Committee appointed to examine the Effects produced by Lightning on a Tree near Edinburgh,' by Prof. PHILLIPS.—The tree in question stands in the grounds of Mr. Wauchope, at Edmonstone, about four miles from Edinburgh, on the Dalkeith road. The surface slopes gently to the north; the substrata are part of the coal formation, and contain at a small depth an abundance of the rich "black band" ironstone. The locality appears remarkably liable to lightning strokes; several other trees having been destroyed there since 1834. The tree examined by the Committee was struck on the 11th of June 1849, on a still sultry day. It is an oak tree. It stood in rather a clear space—the surrounding trees being chestnut, elm, &c. It was a large tree (14 feet in girth), but there were others as high and of rather greater diameter. When struck it was full of sap. The mechanical effects of the lightning were violent. The main trunk of the tree, which appears to have stood about 12 feet high before sending off branches, was rent from top to bottom; some of the branches were broken off; all were thrown down and implicated together, and for some distance upward fissured and twisted: some of the roots were split for a yard or more from the stem. A large mass from the northern side of the tree was driven out, and carried through the air 127 feet, in the direction of the magnetic meridian to N.N.W. Its weight was 2½ cwt. The main stem was entirely denuded of the bark, which was scattered widely around, but most abundantly in a direction opposite to that in which the log of wood was conveyed. Shreds of wood were carried to the north-west and left hanging in the trees. What remained standing of the stem, as well as the parts which had been displaced, was cleft into wedges, by vertical radiating fissures parallel to the laminæ of medullary rays; and these wedges were again cleft by other vertical fissures concentric to the axis of the tree and coinciding with the annual bands of large vertical vessels which are conspicuous in cross sections of the oak. Where these cleavages produced the fullest effect, the wood was divided into long slender prismatic shreds like lucifer matches. The smaller split masses were much twisted. For all these phenomena a simple mechanical cause appears sufficient; viz. an internal expansion and bursting of the main stem of the tree along the surfaces, which by the structure of the tree admitted of the most easy separation, and contained at the time abundance of liquid sap capable of assuming the form and force of elastic vapour. Hence, in the first place, the destruction of the main stem by explosion; the projection of the bark and woody fragments, and the minute and regular cleavage of the fibres. The stem being destroyed as a support, the branches fell in ruinous aggregation round it. It appears that a labernum tree situated about 12 yards to the east had been twice struck by lightning, first (I believe) in 1834, and again in 1844. It was split, but not barked. An elm situated about 100 yards to the north was struck, and in like manner split, but not barked. These differences may perhaps be due to the difference of structure in the wood; but in all cases before attempting to explain the phenomena observed as the effects of lightning, it is desirable to be informed of the times of year when the trees were struck. The precise points of entrance and exit of the lightning cannot be stated. A small quantity of black powder was found in the fissured part of the wood, at the base of the twisted branches; but nothing was observed which could determine the course or the chemical effects of the electrical agent.*

'On the Climate of the Valley of the Nile,' by Mr. T. S. WELLS.—The observations extend from the 6th of December 1849 to the 16th of March 1850. The instruments were kept in a cabin in the boat of an invalid. The cabin was six feet high, 12 feet broad, and 10 feet deep. Its floor was from 1 to 2 feet above the level of the river. The dry and wet bulb thermometers, and the barometer were fixed to a beam in the centre of the cabin, where they were not exposed either to the direct or reflected rays of the sun. There were six glass windows to the cabin, provided with open blinds. Some of these windows were always open during the day, so that the morning and afternoon observations may be considered to represent the temperature of the open air in the shade. Sometimes a window was open until after the evening observations, but more frequently this was not the case, and to this I ascribe the fact that the mean of the evening observations is above that of the morning. A register night thermometer was fixed outside one of the windows, and the lowest temperature observed each day is recorded. These daily observations were made at the hours of 9 A.M., 3 P.M., and 11 P.M., and an abstract of these daily observations was exhibited.

The *mean temperature of the air* for the period of my observations at Greenwich was 39° 3′, on the Nile it was 61°. Thus there was a difference of 22 degrees in the mean temperature of Egypt over that of Greenwich during these months.

The *mean temperature of evaporation* at Greenwich was 37° 4′, in Egypt 55°, being 18 degrees above the mean at Greenwich for the same period.

The *mean temperature of the dew point* at Greenwich was 34° 1′, in Egypt 50° 8′. Thus in England the air was saturated by the quantity of vapour contained in it at a temperature 16 degrees below that at which saturation occurred in Egypt.

The *mean elastic force of vapour* in Egypt was 0·384, at Greenwich 0·214. In other words, the pressure of the watery vapour mixed with the air was capable of supporting a column of mercury higher by $\frac{17}{100}$ of an inch in Egypt than in England.

The mean weight of water in a cubic foot of air in England was 3 grains, in Egypt 4 grains and $\frac{3}{10}$, but still, owing to the higher temperature, the air was much drier in Egypt. When the temperature of the air is considerably above that of the dew point, the air is dry, dissolving or absorbing aqueous vapour without any tendency to precipitation in the form of rain, and it is dry in proportion to the difference between the two temperatures. Thus, although the mean weight of water in a cubic foot of air was greater last winter in Egypt than in England, yet the air was much more nearly saturated with moisture in England than in Egypt. At Greenwich the mean additional weight of water required to saturate a cubic foot of air was only $\frac{4}{10}$ of a grain, while on the Nile it was 1 grain and $\frac{4}{4}$. If we represent air completely deprived of moisture by Zero, and air completely saturated as unity, the *mean degree of humidity* on the Nile was 75 per cent., while at Greenwich it was 85 per cent.

The mean readings of the barometer in the two countries very nearly approach each other; in Egypt being 29·99, at Greenwich 29·87. A glance at the table however showed how very small the extreme range of the instrument was on the Nile.

The *average weight of a cubic foot of air* at Greenwich was 549 grains, in Egypt 527 grains.

Rain fell in various districts of England on averages from 31 to 61 days, while in Egypt it only fell on 5 days, and on three of these a shower was of but a few minutes duration. On two days rain fell heavily at Cairo for several hours.

The mean daily range of the temperature of the air at Greenwich was 11·37, in Egypt 10·31; but while the mean extreme range in Egypt was 38, at Greenwich it was but 29; the mean extreme range in the cabin being only 7 degrees below that on the grass at Greenwich in the open air.

Fog was occasionally but rarely observed. It was general in the Delta in the early morning; but above Cairo was only observed on three occasions.

'On Hourly Meteorological Observations made at Thibet, at an elevation of 18,400 feet,' by Lieut. STRACHEY, R.E.—Great interest attached to these observations from their having been made during 24 hours at an elevation so seldom attained by man, and quite above the clouds and most ordinary disturbing influences, and with a barometer pressure somewhat about 14 inches of mercury. The chief result was that the curves followed very nearly the same changes as in the lower regions they were observed to do.

Col. SYKES went somewhat into detail regarding these and other observations of Lieut. Strachey, in the course of which he stated that the formula of Dr. Apjohn for the reduction of the wet and dry bulb hygrometers was found to be quite inapplicable to Indian climates; the dry bulb being lowered in its indications by the proximity of the wet, and the wet bulb collecting and retaining a wet atmosphere of its own whose temperature it gave,—not that which it would attain at the lowest were this atmosphere continually removed; one consequence of which was great discrepancy of result according to the part of a room in which it was placed.—Lieut. STRACHEY corroborated this, and said he had found the numerical coefficients of Mr. Glaisher, which varied with the temperature, and which that gentleman had tabulated, much more applicable to Indian hygrometry.

Col. SYKES then gave a brief account of several Storms of Hail which had occurred in India, collected from various sources by Dr. Buist. The weight of some of these masses of ice were over 14 lb. Many of them under a rough external coat contained clear ice within, and with that peculiar radiated structure which he had elsewhere described. Immense aggregated masses of these great hailstones were in some places brought down from the mountain ravines by the succeeding torrents, and in one of these conglomerations a snake was found frozen up and apparently dead, but it soon thawed and revived.

'On the means of computing the quantities of Aqueous Vapour in the Atmosphere at various places and heights,' by Mr. T. HOPKINS.—The author stated that meteorologists usually estimated the total amount of vapour in a vertical column of the atmosphere from the dew point at its base, from which they inferred its tension, and thence the total quantity. This he asserted was an erroneous method, as it neglected the effort of the vapour expanding and forcing itself upwards through the air, a colder medium than would exist in each successive foot if nothing but the vapour itself were present. This opinion he illustrated by diagrams.

'On the Causes of the Rise of the Isothermal Lines in the Winters of the Northern Hemisphere,' by Mr. T. HOPKINS.—Mr. Hopkins examined some of the isothermal lines exhibited in the maps recently constructed by Prof. Dove, and objected to the theory which is put forward to account for the irregular rise of the winter isothermals in the Northern Pacific, Atlantic and Arctic Oceans through the warming influence of the water of those oceans. But if neither the proportional extent of the surface of the sea, as compared with the land, nor the flow of a warm current of water carries high temperature to these northern latitudes, what is the cause of such temperature being found there? A reply is prepared by Prof. Dove himself, where he says,—"This surface," meaning the surface of the globe, "being a highly varied one, the sun's influence on it is also constantly varying, for the impinging solar heat is employed in raising the temperature of substances which do not change their condition of aggregation; —but when engaged in causing the melting of ice or the evaporation of water it becomes latent. When, therefore, the sun, returning from its northern declination, enters the southern signs, the increasing proportions of liquid surface upon which it shines causes a corresponding part of its heat to become latent, and hence arises the great periodical variation in the temperature of the globe which has been noticed above,"—meaning the difference of temperature of the northern and southern hemispheres. Why suppose that this effect of the evaporation of water is experienced only in the relative temperatures of the northern and southern hemispheres? And why not trace the effects of *condensation* of vapour, as well as of the *evaporation* of water? It is evident that heat is absorbed and made latent wherever vapour is produced, and it is equally clear that that heat is given out and made active wherever the vapour is condensed! It does not appear from the atmospheric currents which prevail that any portion of the vapours of the southern hemisphere passes into the northern, to be condensed within or near to the basin of the Pacific, and there is no reason to suppose that it does;—but in the basin of the Atlantic it is sufficiently evident that vapour does not so pass. The vapour which passes over the Northern Atlantic, and is condensed beyond the British Islands and Norway, is supplied from the tropical and other seas north of the equator. The West Indies constitute the principal point of departure of this vapour, and in the month of January it is carried by south-western and western winds to those localities where the isothermal lines advance farthest towards the Pole. It is accordingly to the condensation of this vapour, and not to the

* Since the Report was presented, Mr. Wauchope has cleared a larger portion of the roots, and has found them split and *blackened* considerably.

neighbourhood of the Atlantic Ocean, in the latitude that we are to attribute the high temperature of this part of the world in the winter. The Atlantic Ocean is as near to Labrador as to Norway, but there is little condensation on the coast of the former, whilst there is much about the latter. Indeed, as far as we know, condensation of vapour is the only influence that operates exclusively on the eastern coasts of the two oceans, the Pacific and the Atlantic, and therefore to it we may attribute the warming of the localities, particularly in the Arctic Ocean, as indicated by the isothermal lines. Condensation, we know, furnishes a constant and abundant supply of heat, not like diffusion by contact, nor radiation from surfaces nearly equal in temperature, but by the energetic chemical action which converts an aeriform substance into a liquid, and consequently changes the heat from a latent to an active state. The greatest irregular rise in the isothermal lines is found in the winter of the northern hemisphere, just at the time that the condensation of vapour produces the greatest effect on the temperature of the air; and the temperature rises the most along that line or stripe where the largest amount of condensation takes place; and in that locality the same temperature reaches the highest latitude, showing that condensation of vapour is the cause of the rise of the isothermal lines in the parts.

'On the Daily Formation of Clouds at Makerstoun,' by Mr. T. Hopkins.—The author went into an examination of the meteorological registers kept at Makerstoun for the year 1844, to prove that the facts registered were in harmony with and tended to establish the theory he had advanced, that the horary fluctuations of the barometer were attributable to the daily vaporization of water by the sun, and the daily condensation of a portion of that vapour into cloud. The great difficulty being to account for the fall of the barometer from ten in the morning till four in the afternoon. At Makerstoun, the state of the atmosphere as to cloud was registered by noting an overcast sky by 10, a cloudless sky by 0, and intermediate states by intermediate numbers. The state of the wet and dry bulb thermometers was also regularly noted, showing both the activity of vaporization and the tension of vapour.

'On the Passage of Storms across the British Islands,' by Mr. R. Russell.—The views of the writer were illustrated by reference to the storm in October last.

'On Remarkable Thermometrical Maxima at or near the Moon's First Quarter, during twelve years, from 1839 to 1850,' by Mr. R. Edmonds.—In continuation of a paper on the same subject read at the meeting of the Association in 1845.

'On some extraordinary Electrical Appearances observed at Manchester on the 16th of July 1850,' by Mr. P. Clare.—About nine o'clock, the clouds being very dark to the west and south-west of Manchester, but not so dense to the south and south-east, very frequent flashes of sheet lightning were observed, whilst for a period of nearly half an hour there were frequent corruscations of lightning observed between the south and south-west, all moving in a direction from south-west towards south, at an elevation of from 14° to 20° above the horizon. Sometimes the appearances were like the roots of a tree, and occasionally with bright balls at the termination of all or some of the branches. On several occasions, immediately after a stream of light seemed to pass from near the south-west towards the south, through a space of 10° or 12°, a luminous ball of considerable size suddenly appeared and moved along the line of the stream with a velocity so slow that its progress was easily observed, and this was repeated several times near the same place.

'On Meteorological Phenomena at Huggate, Yorkshire, for 1849,' by the Rev. T. Rankine.—The results may be thus abstracted:—*Thermometer*, coldest day, January 3, night thermometer, 19°, being 5° less cold than in 1848; hottest day, July 12, thermometer, 71°, being 5° less heat than in 1848; lowest range (or change), June 11 and December 13, viz., 1°; greatest range, May 12, viz., 26°, being same as on May 18 last year. *Barometer*, lowest point, 28·20 in., Jan. 10, being 0·18 in. higher than in 1848; highest, 30·42 in., October 29, or 0·16 in. higher than in 1848; lowest range, 0·01, January 17 and February 8; greatest range, 0·66 in., February 14, being 0·19 in. less than in 1848. *Hygrometer*, dry bulb, minus wet, lowest, 0·5°, March 23, June 5, October 25; greatest depression of wet bulb, 8° 5′, June 27, being 3° 5′, less than in 1848; during heavy rain and intense frost both are nearly equal. The author found the cold water in the tube to affect by radiation the dry bulb; but a sheet of paper interposed got rid of this source of error. *Rain*, total, 29·770 in., being 12·855 in. less than in 1848; least rain in February, 0·720 in.; most in July, 4·750 in. *November Atmospheric Wave*, edge of anterior trough, 29·95 in., barometer, on November 10, gentle breeze S.; bottom of trough, 29·17 in., on November 15, wind W.; crest of wave, 30·00 in. on the 17th, wind W.; bottom of posterior trough, 28·95 in., on the 24th, wind W.; height of the edge, 29·87 in., on the 27th, wind N.W.; seventeen days passing, same as in 1848. Aurora on August 12, resembling a fan; on the 28th, perpendicular beams; December 23, sky dappled in shape of a dome. *Halo*, a beautiful one, about 8° around the moon, December 26, between 9 and 10 P.M., moon nearly full, wind W. *Hurricane*, night of December 26, about twelve o'clock, barometer fell from 29·80 to 29·11 in.; thermometer, 34°; a hurricane from W. followed; previously vast masses of cirro-cumulus had been floating about. *Winds*, E., 6; W., 44; N., 2; S., 15; N.E., 31; N.W., 22; S.E., 15; S.W., 26. *Thunder*, April 28; June 14; July 18, 21, 30; August 17, 18. *Weather*, 129 days clear, 66 days occasional rain, 22 days frost, 15 days occasional snow, 226 days wholly or partially dull; in 1848 there were 229 days wholly or partially dull.

TUESDAY.

'On Isoclinal Magnetic Lines in Yorkshire,' by Prof. Phillips.—The author stated that about fifteen years since, in the course of some experimental researches in terrestrial magnetism, his attention was caught by the apparently deep flexures of the isoclinal lines in Yorkshire,—flexures entirely independent of local magnetic polarities. As a general inference from his inquiries, he suggested the dependence of these flexures on the physical configuration of the country, the isoclinals advancing northwards on and towards the hills, and retiring southward in the valleys.—(See Brit. Assoc. Report for 1836, p. 51.) The observations on which this conclusion was based were made by means of instruments which the author had himself constructed. For verification of these and other results, he procured in 1837, an excellent 6-inch dip circle by Robinson, and has now obtained an additional set of determinations with this new instrument, which may be confidently trusted, with careful manipulation and in *magnetic weather* not unfavourable, to a minute of a degree or less. The results being collected either by combination into five lines nearly parallel to the magnetic meridian, or into groups which represent separately the elevated and depressed portions of the surface, agree with the inferences which were presented to the Association in 1836; the isoclinals retiring southward in the vale of York, and advancing northward both in the eastern and the western hills. The author showed the general probability of this result from other sources of evidence; remarking on the fact, that in plains and even countries the *local isoclinals* were parallel to, or deviated but little from, the *general isoclinal* obtained by the method of least squares, while in hilly districts, as the Cambrian tract, North Wales, South Wales, and the mountain tracts of Ireland, the *local isoclinals* were much, but still systematically bent from their general direction, and sometimes (as between Criffel and Chiddaw) crowded together in a singular manner. He noticed as desirable for the complete reduction of delicate observations of this nature, a set of careful measures on the diurnal variations of dip. His own researches on this point indicated a single daily progression, with a maximum at 9 A.M., mean at 3 P.M., and minimum at 9 P.M. The hours, however, and the amount of difference from maximum to minimum appeared subject to much fluctuation. As an average, about 3′ appeared to be the difference (in summer) between maximum and minimum. Possibly, the deduction of this variation, by resolving the horizontal and vertical forces in the direction of total force, would be preferable. (The late researches of Mr. A. Broun, by whom the periodical variations of the dip had been traced at Makerstoun, were here referred to). The annual variation at York appeared to be on an average of thirteen years about −2·′3. The author proposed to increase the number of stations to fifty, before submitting the results to a final and rigorous computation.

Prof. Forbes had investigated this subject to some considerable extent, with the aid of an excellent dipping-needle by the late Mr. Robinson; and had satisfied himself that differences of level in the surface of the earth did sensibly affect the indications of the needle. There were also some excellent observations on record by M. Necker, made among and in the neighbourhood of the Alpine ranges; and the conclusion at which he arrived was, that elevations exercised an influence on the needle irrespective of the masses of magnetic minerals which they contained in some localities.—The Astronomer Royal bore testimony to the importance of these researches of Prof. Phillips, and thought there could be no doubt that they proved that a law existed which regulated them. He considered it was of importance to determine the horizontal and vertical forces. The instruments and experiments had arrived at a more perfect state as to the former; but the latter were equally, if not more important.

'On a Question of Probabilities which occurs in the use of a fixed Collimator for the verification of the Constancy of Position of an Azimuth Circle,' by the Astronomer Royal.—The author said, his chief object in bringing this communication before the Section was, to obtain the assistance of its mathematicians in extricating him from a difficulty, or at least a doubt, in which he found himself involved. In determining an azimuth say of the moon, or of any other object, there were three independent elements which he used, and the probable errors of which he wished to compare with each other. There was first the fixity of the circle itself, when once placed; there was next the indication of the floating collimator, which was used as an independent check; and thirdly, the stars themselves were used as a means of obtaining the required azimuth. The object was to determine and compare the probable error of each of these. By observations on any one day, he got numerical values of the differences of the azimuths determined each way. Then calling their probable errors great X, Y, and Z respectively, and dividing each by its probable error, adding the squares, and making the sum a minimum, he was able to obtain each in terms of these probable errors, and of the numbers obtained or the differences. Then, by taking a series of such daily observations, and resorting to the calculation for each, he conceived he was warranted in applying the theory of probabilities to obtain from this series the probable error of each. He thus got finally three equations and three unknown quantities, from which, by elimination, each was obtained separately. The result was very striking; it was, that the probable error of the fixity of the instrument was ten times less than that of the stars, which, however, included the personal equation of the observer, error of clock, transit telescope and others. The doubt, however, which assailed him was, whether he was justified in applying the doctrine of probabilities to obtain from those series the probable error of quantities which were not themselves mere results of actual observation, in which case there would be no doubt of its legitimate application, but where the quantities were, in each term of the series, partly the result of observation and partly deductions of formulæ. From this doubt he requested their assistance, either to extricate him or convince him of the incorrectness of the method he used. One thing was surprising, if the method were unsound, viz., that the result was the same from many independent calculations.—Another question he begged to propose to the mamtheaticians for their assistance. It was well known that an equation of any order could be lowered one dimension, if one of its roots could be obtained. Now, the question he wished to propose was, whether any mathematician knew any similar mode of lowering an equation, say of the third degree, which involved say three unknown but independent quantities?

'On the Argument for the Physical Connexion of Double Stars, deduced from the Theory of Probabilities,' by Prof. Forbes.—The author read a passage from Herschel's 'Outlines of Astronomy,' where this argument is set forth. Mitchell, in the year 1767, in a paper in the Philosophical Transactions, was the

first who advanced this argument. He calculates the odds as 500,000 to 1 against the stars which compose the group of the Pleiades being fortuitously concentrated within the space they occupy, and thence infers the probability of some physical connexion between them. Struve has pushed this argument much further. In his classification of double stars he has applied it to estimate the improbability of the occurrence of even double stars in close proximity. He calculates the odds as 9,570 to 1 against any two stars from the first to the seventh magnitude falling, if fortuitously scattered, within 4″ of one another. The number of such binary combinations actually observed at the date of the calculation, was 91, and more have since been added to the list. Again, he calculates the odds against any two stars of a number fortuitously scattered, falling within 32″ of a third, so as to form a triple star, as not less than 173,000 to 1, while four such stars triple were known to exist. The conclusion, adds Sir John Herschel, of a physical connexion of some kind or other is, therefore, unavoidable. Against the principle of this argument, Prof. Forbes, though with much diffidence, felt himself called on to protest. He owned he could not attach any idea to what would be the distribution of stars, or of anything else if "fortuitously scattered," and therefore he must regard with hesitation, if not doubt, an attempt to assign a numerical value to the antecedent probability of any given arrangement or grouping whatever. To him it appeared that an equable spacing of the stars over the sky would seem to be far more inconsistent with a total absence of law or principle than the existence of spaces of comparative condensation, including binary or even more numerous groups, as well as regions of great paucity of stars. As an illustration of this, he adduced the representation of stars and their grouping by sprinkling viscid white paint from a coarse brush upon a dark ground; by which, although it was impossible to conceive a nearer approach to "random scattering," yet he had witnessed the production by it of an artificial galaxy, presenting every variety of grouping with double and triple points innumerable; nor could he conceive how on any reasonable theory of chance it should be otherwise.

'On the Lunar Surface, and its relation to that of the Earth,' by Mr. Nasmyth.—The subject was illustrated by a series of drawings which the writer has executed by the aid of a powerful telescope, which he has made for himself for the express purpose of following up his investigations on the subject in question. These appear from the drawings exhibited and the description given by Mr. Nasmyth to afford striking illustrations of the nature and action of some of those agencies which in remote periods of the Earth's geological history has given to its surface many of its most remarkable features; namely, as to the causes of volcanic action, the protrusion of igneous rocks, the upheaving of mountain ranges, as well as the submersion of extensive portions of the Earth's surface,—all of which vast geological phenomena Mr. Nasmyth appears to assign to a few grand and simple prime causes, resulting from the consolidation and alternate contraction of the crust and interior of the Earth and Moon—both of which planets appear to have originally been in a molten condition.—After drawing attention to the vast number and magnitude of crater-formed mountains with which every portion of the Moon's surface appears to be covered, Mr. Nasmyth proceeded to give the reasons for the conclusion, that these crater-formed mountains are really the craters of extinct lunar volcanoes; pointing out the frequent occurrence of the central cone, the result of the last eruptive efforts of an expiring volcano, a feature so familiar to all those who have observed volcanic craters on the Earth's surface. This central cone Mr. Nasmyth showed to exist in the majority of the lunar craters; and thereby drew the conclusion, that they were the result of the same kind of action which has produced them on the volcanoes of the Earth. The cause of the vast numbers of such volcanic mountains with which the lunar surface is bespattered was next considered;—and traced to the rapid consolidation and contraction of the crust of the Moon; whose mass or bulk being only $\frac{1}{81}$ of that of the Earth, while its surface is the $\frac{1}{13}$, has, in consequence of these proportions, a radiating or heat dispensing surface four times greater than that of the Earth in relation to its bulk. From this geometrical consideration Mr. Nasmyth explained how it was that by the rapid cooling and collapse of the crust of the Moon on its molten interior, the fluid matter under the solid crust was by this "hide-binding" action forced to find an escape through the superincumbent solid crust, and come forth in those vast volcanic actions which in some remote period of time have covered its surface with those myriads of craters and volcanic features that give to its surface its remarkable character. The cause of the vast magnitude of the lunar craters was next alluded to; and assigned, as in the former case, to the rapid and energetic collapse of the Moon's crust on its yet molten interior,—the action as regards *the wide dispersion* of the ejected matter being enhanced by the *lightness* of the erupted matter, seeing that the force of gravity which gives the quality of *weight* to matter on the Moon as on the Earth is so very much less on the surface of the Moon than on the Earth,—so that the collapse action had to operate on material probably not half the weight of cork, bulk for bulk. The causes of those vast ranges of mountains seen on the Moon's surface was next touched on; and Mr. Nasmyth endeavoured to explain them by the continued progress of the collapse action of the solid crust of the Moon crushing down or following the contracting molten interior, which by the gradual dispersion of its heat would retreat from contact with the interior of the solid crust, and permit the crust to crush down and so force that portion of the original surface *out of the way*, and in consequence of this action assume the form and arrangement of mountain ranges. Mr. Nasmyth, in illustration of this important action, adduced the familiar case of the wrinkling of the surface of an apple, by reason of the contraction of the interior and the inability of the *surface* to accommodate itself to the change otherwise. The mountain ranges in question Mr. Nasmyth considers to be nothing more or less than the material which in the original expanded globes formed the comparatively level crust of the Moon and Earth. The fall of the unsupported crust on the retreating nucleus resulting in a tremendous splash on the subjacent molten mass, was described to yield a very probable explanation of the appearance of granitic and igneous centres of certain mountain ranges, as well as the injection of igneous rocks in the form of trap dykes and basaltic formations, which appear to have come forth in this manner from below the crust of the Earth and overlay formations of comparatively very recent formation. The origin or cause of those bright lines which radiate from certain volcanic centres on the Moon's surface (Tycho, for instance) is alluded to, and illustrated by a very striking experiment of causing the surface of a globe of glass filled with water to collapse on the fluid interior by rapidly contracting the surface while the water had no means of escape. The result was the splitting or cracking up of the surface of the globe in a multitude of radiating cracks, which bear the most remarkable similarity to those on the Moon. Mr. Nasmyth further illustrated this subject by reference to the manner in which the surface of a frozen pond may be made to crack by pressure from underneath,—so yielding radiating cracks from the centre of convergence, the chief discharge of water will take place, while simultaneously all along the lines of radiating cracks the water will make its appearance:—thus explaining how it is that the molten material, which had in like manner been under the surface of the Moon during that period of its history, came forth simultaneously up through the course of the cracks, and appeared on the surface as basaltic or igneous overflow, irrespective of surface inequalities.

This communication was considered so important that, at the special request of the President and other officers of the Association, it was repeated at the Evening Meeting of the Association in the Music Hall.

'On a Tissue woven by Caterpillars,' by Mr. J. Dennistoun.—In the early part of this century there lived at Munich a retired officer, Lieut. Hebenstrait, who amused himself by experiments on the means of giving consistency to the gossamer produced by caterpillars, which is occasionally seen blown about in flakes over the fields in Germany, and he was at one time sanguine of rendering it available as a material for ladies' dress. It is said that his plan was to prepare a paste of lettuce or other leaves beat up with butter, and, after spreading it thinly over a smooth surface of stone or wood on an inclined plane, he placed at the lower end a number of chenilles or caterpillars of the proper species. These animals gradually ascended the incline, devouring the paste, and depositing as they proceed a sort of tissue until the whole surface was uniformly covered with it. He is reported to have produced open work designs by drawing the pattern with a hair pencil dipped in olive oil before the animals begin to work. These I never saw, but I have seen one veil on which were some letters exactly resembling a watermark on paper, the secret of which I do not know. The inventor pursued his experiments with great secrecy, in the hope of turning his invention to valuable account; but finding this impracticable, it appears that he produced but very few specimens, which are now preserved in various museums on the Continent. I have seen two besides my own, which I procured at Munich, in 1837, after having advertised for it several months. The objections to using this tissue seem to be chiefly its exceedingly flimsy quality, and its very adhesive properties, which render its management and preservation extremely difficult, attaching itself closely even to the smoothest surfaces, from which it can be separated only by the breath. My veil is about 42 in. by 24 in. One of 26½ in. by 17 in. is said to have weighed only 1½ grain. Another containing 9 square feet is mentioned as weighing 4¼ grains, while the same surface of silk gauze weighed 137 grains, and of fine lace 262½ grains. It would seem that the art was in some degree known at an earlier period, and occasionally practised in convents, where coloured drawings on small bits of it are said to have been made. I have seen in all four of these on the Continent, and two or three on which impressions from copper plate had been taken,—always of sacred subjects. One of the drawings is in my possession, about 7 in. by 5 in., executed apparently in the last century, and I have seen one dated about 1770.

This beautiful tissue was unfolded to the Section by Mr. Dennistoun and Sir D. Brewster. It was rather more transparent than the finest lace veil, but it floated about with every slight current in the air of the Section-room, after a manner quite its own.

At this stage of the proceedings, Sir D. Brewster exhibited to the Section several Talbotypes from negatives on albumen, by Messrs. Ross & Thomson, Edinburgh, and by M. Constant, of Rome; from negatives on paper, by Mr. S. Buckle, Peterborough; and from negatives on gelatine, executed in Paris by M. Bolard.

'On a New Solid Eye-piece,' by the Rev. J. B. Reade.—The author stated that he had been able to get rid of the two well-known defects of the common negative eye-piece, viz., a play of false light and the formation of a false image, or as it is generally termed, *a ghost* of a planet or star, by simply filling the eye-piece with water. The addition of the water causes the ray of light to pass to the eye without suffering any inner reflexions from the surfaces of the lenses of the eye-piece. It also makes the eye-piece positive instead of negative; while at the same time the magnifying power remains nearly the same,—the magnitude and flatness of the field are preserved,—and the achromatism is not disturbed. It is, however, desirable to make the inner surface of the field lens a little convex, as the ray now passes out of glass into water, and not into air. The Astronomer Royal of Scotland, after trying the eye-piece upon Saturn, double stars and clusters, expressed a very decided opinion as to its admirable performance generally, as well as on the increased blackness of the field, owing to the absence of all false light. To avoid some little trouble arising from the use of water, the author proposes to substitute glass or rock-crystal for the water, and to cement the surfaces together with Canada balsam; but in this case the inner surfaces of the eye and field lens must have a diminished radius of curvature. It was added that the use of an eye-hole, exactly as in the eye-piece of a Gregorian telescope, is not only desirable, but for large object-glasses indispensable. Without it, the aperture of an object-glass must be reduced to 3 or 4 inches when turned upon the sun, or the dark glasses will infallibly be cracked; but with it, all injurious heat is stopped out, and the full aperture can

be used as in the case of a Gregorian of 7 or 8 inches in diameter. This arises from the different refrangibility of the rays of light and heat. In the ordinary use of a prism, it is well known that the rays of heat are less refrangible than the rays of light, and are in fact at a maximum beyond the rays of the spectrum; but when the sun's rays are brought to a focus by means of an achromatic object-glass, the author finds that the point of most intense heat is within the focus of the compound lens. In a direct experiment with a 6-inch object-glass of Tulley's, he found that black glazed paper was not burnt but only smoked when held two inches beyond the focus, —at 1 inch it took fire in 39 seconds,—at half an inch in 27,—at the focus in 24,—at a quarter of an inch *within the focus* in 11,—at half an inch within in 14,—and at 1 inch within in 19 seconds. Hence it follows, from the different positions of the principal foci of light and heat, that the eye-piece which makes the image rays parallel, leaves the hot rays divergent, and passing to some extent on the outside of the illuminating rays, and the eye-hole becomes essentially important, not only for the general purpose of stopping out false light, but particularly for stopping out all injurious heat during the examination of the sun with large telescopes.

'On Polygons inscribed on a Surface of the Second Order,' by Sir W. R. Hamilton.—This problem, though suggested by the theory of Quaternions, yet admitted of a purely mathematical solution,—the outline of which Prof. Sir W. Hamilton gave to the Section.

'On the Theory of Magnetic Induction,' by Prof. Thomson.—The author said the idea of making this communication arose out of the paper read on Friday last by Mr. Tyndall, though they were not directly connected. He conceived that a foundation for a complete theory of magnetic induction in crystallized or non-crystallized matter could be laid on two principles. 1st. Any different rigidly magnetic magnets, perfectly hard steel magnets for example,—or electro-magnets without soft iron cores, or groups of such magnets, would produce the same inductive effect on a given substance when separately brought into its neighbourhood, if they produce the same force in the space occupied by it; or the inductive manifestation of a body depends only on its own form and constitution, and on the field of magnetic force in which it is placed. Here it is to be noted that in the mathematical theory of magnetism, the "magnetic force" or the resultant magnetic force at any point is defined as the force which the north pole of an infinitely thin uniformly and longitudinally magnetized bar of standard or unit strength would experience when placed at this point:—these may be called unit bars or bars of unit strength. 2nd. When any number of magnets act simultaneously in inducing magnetism in a given body, each produces the same induction as if the others were removed; and the active state of a body is the state of magnetization which results from the co-existence or superposition of the separate distributions of magnetism due to the different magnets. The author stated that he did not apprehend any doubt could be raised as to the truth of the first of these principles. But the second is one which must be proved or disproved by experiment; and although probably as far as experiments hitherto made have reference to it, they support it, yet we cannot consider it as a rigorously established experimental law. Thus, even if it be confirmed by ordinary cases of induction in soft iron, it is possible that a piece of soft iron when very strongly magnetized, as it may be, for instance, by an electro-magnetic helix, is in a state in which it is not susceptible of magnetization to the same extent or with the same symmetry as regards the substance of the iron by the action of an independent magnet brought up to it, as it would be if originally unmagnetic; or only magnetized by the earth's influence. It is natural to expect that the principle as stated above is strictly applicable to bodies susceptible of but feeble inductive magnetization: in fact, to all bodies ferro-magnetic or diamagnetic which contain little or no iron in their composition; but Plücker's experiments, in the description of which an increase of the magnetizing force, unaccompanied by any alteration of the "lines of force," is asserted to make a change from attraction to repulsion in certain cases of bodies commonly called diamagnetic placed in fixed positions in the neighbourhood of a magnet seem to be at variance with it. It is, therefore, a matter of the utmost importance to test this principle experimentally, which when it shall be accomplished it will only be necessary to give determinate variable expressions to certain co-efficients, which, for the want of such experimental data, are at present taken as constant. The author said he ventured to suggest that an explanation of the very remarkable phenomena described by Plücker in papers in the 54th and 55th volumes (1848 and 1849) of Poggendorff's 'Annalen' may be found in an alteration in the lines of force of the inducing magnet accompanying an increase or diminution of its strength, and depending on the not improbable circumstance that the soft iron core does not receive magnetism with an invariable distribution.

'On the reduced Observation for Six Years of the Winds in the Regions of Glasgow,' by Prof. Nicol.—The Professor exhibited and explained the tabulated results of six years' work of Osler's Anemometer, —also diagrams showing at a glance the direction, strength and total resultant direction of the winds which blew at Glasgow during each of the four seasons of each of the six years; and stated that this was one branch of a general investigation which he was proceeding with of the entire meteorology of Glasgow.

The Section, having still many papers on the list, and the hour of the meeting of the General Committee having arrived, adjourned until half-past ten o'clock on the next (Wednesday) morning.

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Section B.—Chemistry, including its Applications to Agriculture and the Arts.

'On the action of the Soap Test upon Water containing a salt of magnesia only, and likewise upon water containing a salt of magnesia and a salt of lime,' by Mr. D. Campbell.—This was an examination of the value of the soap test of Dr. Clarke. The conclusions arrived at were—1st. That water containing sulphate of magnesia alone, acts towards the soap test in producing with it a perfect lather, similarly or nearly so, as does water containing a lime salt alone, —but only when the equivalent of magnesia salt does not exceed six grains of carbonate of lime in a gallon of water.—2nd. That the degrees of hardness of an ordinary water cannot be inferred by the rule. Compute the grains of lime, magnesia, oxides of iron and alumina, in a gallon of water, each into its equivalent of chalk. The sum of these equivalents will be the hardness of the water.—3rd. That the degrees of hardness of a water containing magnesia and lime salts, as shown by the soap test as it is now applied, cannot in every case be taken as representing the amount of these salts in the water; nor in nearly any instance can it be considered as giving the amount of lime in a water when magnesia is present.—4th. That water might show by the soap test a small degree of hardness in comparison to the considerable quantities of salts of magnesia and of lime it might contain,—and trusting to this method of analysis alone when selecting water for ordinary use and for steam purposes, might lead to a water being adopted which might not be conducive to the general health, and which would leave considerable deposit in vessels in which it was boiled—a great deterioration to its use in steam generating.

'Remarks on some Chemical Facts connected with the Tessellated Pavements discovered at Cirencester (the Roman Corinium),' by Prof. Buckman.—In this paper it was shown that the materials of which pavements are composed are of two kinds:—the first derived from rocks of the district and termed natural, the second composed of clay, fictilia and glass, artificial tessellæ. The natural tessellæ, many of which are so altered by chemical manipulation as to cause many of them to be referred to foreign rocks, consist of bits of stone from the chalk, oolite, lias, and red sandstone formations, were clearly referred to their origin, and the processes by which they were prepared for pavements were pointed out. Thus, a grey colour was produced from a cream-coloured oolite, the change of colour being caused by a process of roasting. This is dependent upon the fact that the oolite bed of which they are made contains iron and organic matter, the latter of which prevented the iron peroxidizing, and thus the grey was due to a protoxide of that metal. The artificial tessellæ from pottery consists of shades of red and black; the reds all being due to a peroxidation of the iron in the clays from which they were made,—whilst the blacks were the result of baking in "smother furnaces," as long since pointed out by Mr. Artis, so that the carbonaceous matter of the fuel with which the baking was effected was prevented from escaping, and, as he would lead us to infer, the black smoke penetrates the clay and thus blackens it. The author, however, showed that this smoke acted chemically, by preventing the oxidation of the iron, and thus the change from the dark colour of the clay to red which usually occurs in burning pottery and bricks was prevented. Reference was then made to a medallion of the pavement representing Flora, in the first drawing of which the head-dress and flowers held in the hand were coloured verdigris green, the hue these objects presented on being exhumed; but as this was unsatisfactory in chromatic arrangement, the author suspected some subsequent chemical change,—and on scraping away the green from the surfaces of the tessellæ in question, a beautiful ruby glass presented itself. New drawings (which were also exhibited) were then made with ruby instead of green colour: the result of which was, that what was before inharmonious in colour and grouping, at once assumed harmony in these respects, and became perfectly intelligible. An analysis of the glass made by Prof. Voelcker showed the cause of change from ruby to green to have been due to the fact that the antique ruby glass had derived its colour from peroxide of copper, and that the tessellæ had become covered with carbonate of copper from a decomposition of their surfaces.

The 'Phosphorescence of Potassium,' by Mr. W. Petrie.—While speculating on the consequences of the dynamical theory of heat, I was led to the conclusion that cold potassium *ought* to be found *luminous;* and farther, that it ought to be only about a *tenth part* as *luminous* as *phosphorus*.—On testing this experimentally, with the precautions for sensitive vision which the anticipated feebleness of the light indicated to be necessary, the result was, that on dividing a bit of potassium, (which was quite dry, being protected only by a coating of bees' wax,) the halves showed two *distinctly luminous sections;* the light being about *a tenth* of that from a similar surface of phosphorus, as far as the eye could make the comparison. The light diminished, naturally, as a protecting coating of oxyde was formed, but remained just perceptible to the most sensitive sight, as long as half an hour.

'On the presence of Fluorine in Blood and Milk,' by Dr. G. Wilson.—In 1846 I announced to the Royal Society of Edinburgh that after finding that fluor spar was soluble in water, and occurred in many natural waters, I thought it well to seek for it in milk and in blood, and found distinct evidence of its presence in both. The proofs however were not so decisive as I could have wished. This summer, however, I have employed the fresh drawn blood of the ox. About 26 imperial pints or 3 gallons of blood were made use of. From the large scale on which the experiment was conducted, and the simplicity of the process followed, the evidence in favour of the presence of fluorine in the blood of the ox seems unexceptionable; and it cannot be doubted that the blood of other animals will be found to contain the same element. I presume it to be present in the state of fluoride of calcium, and that its amount is very small, but I have not attempted its quantitative determination. Milk was examined in a similar way, with nine imperial pints of rich milk from a country farm. The vapour which they evolved etched glass distinctly. The ashes of 12 lb. of new skim-milk cheese made this spring treated in the same way occasioned deep etching of glass. The ashes of four imperial pints of whey treated in the same way have barely marked glass so as to show the faintest outlines when breathed upon. In all probability the fluoride of calcium is associated with the phosphate of lime, and when milk is coagulated separates along with the caseine.—Dr. Wilson also stated that he had repeated the inquiry into the solubility of fluoride of calcium in water, reported to the Association at its Southampton meeting, and with the same result, viz., that 16 fluid ounces, or 7,000 gr. of water, at 60°, dissolve 0·26 gr. of fluor spar.

'On the presence of Carbonates in Blood,' by

Prof. G. I. Mulder, of Utrecht.—The intention of Prof. Mulder was to show experimentally that blood contains carbonic acid not merely in solution, but also in chemical combination with bases and organic substances, as globulin, albumen, &c.

'On a compound of Iodine and Codeine,' by T. Anderson, M.D.—The compound of Iodine and Codeine which formed the special subject of this communication is obtained by mixing together alcoholic solutions of equal quantities of Codeine and Iodine, and leaving the mixture to spontaneous evaporation, when the new compound is deposited in crystals. The compound is insoluble in water, sparingly soluble in cold alcohol, but readily in boiling, and it is again deposited in small triangular plates as the solution cools. Its crystalline form has been determined by Prof. Haidinger, of Vienna, who finds it to belong to the doubly oblique system. The crystals have a fine diamond lustre and a deep purple colour by reflected, and ruby red by transmitted light. In powder its colour is cinnamon brown.

'On a direct method of separating Arsenious from Arsenic Acid, and on its application to the estimation of Nitric Acid,' by Mr. J. Stein.

MONDAY.

Section C.—GEOLOGY AND PHYSICAL GEOGRAPHY.

'On Erosion from River Action,' by Prof. Hitchcock.—The Professor stated that in New England it was easy to distinguish the phenomena produced by diluvial (or drift) action from those produced by the agency of rivers. The drift had acted from the north on the northern sides of the hills, planing away their protuberances; whereas the rivers had cut for themselves deep winding channels. The most remarkable river-actions now going on were the increase in the deltas of rivers and the recession of cataracts. The principal examples of river-action adduced by the Professor, were the gorge in the valley of the river Connecticut, 8 miles long and 500 feet deep; the walls of rock, 60 feet or 70 feet high, on the Potomac, near Washington; the falls in Wisconsin river, where for 1½ mile the trap-rock is worn to the depth of 150 feet; the gorge of the river Genessee, 7 miles long and 100 feet deep. The following conclusions were deduced from these observations:—1. Most rivers have now ceased to wear away their beds;—2. Originally, barriers existed, which raised the level of many rivers above what it is at present;—3. The amount of erosion was the same in all parts of the world where the rocks were the same;—4. That if the crystalline rocks had been eroded to the depth of several hundred feet by rivers, it was probable that all other gorges in softer rocks had been made by the rivers in them;—5. That the period required for this purpose must have been inconceivably long,—a conclusion which harmonized with deductions from other geological data.

'On River Terraces in New England,' by Prof. Hitchcock.—The banks of the river Connecticut were covered by a deposit of unstratified drift, consisting of angular blocks, sand and mud, extending for a distance of 300 miles, and rising to a height of 1,000 feet or more on the hills: above this drift the river deposits formed a series of terraces on either bank, of which the highest consisted of coarse materials, derived from the drift, and not much stratified; the lower terraces were successively formed of finer materials and were regularly stratified. The Professor considered that these terraces had been formed by the river when at higher levels; and that the surface of the country had been rising in a quiet way, without paroxysmal movements.

Mr. Sedgwick argued that it was incorrect to assume that because many American rivers, having cataracts, had formed deep gorges, that, therefore, *all rivers* had excavated the ravines and valleys through which they flowed. In Britain the rivers flowed in cracks and valleys, formed during previous periods of elevation, and had done scarcely anything to modify them; the whole of our rivers were newer than the period of the boulder clay, and the epoch of their agency went back but a few thousand years. He referred to De Luc's Treatise as a triumphant refutation of the idea that river-valleys could be formed by the streams now flowing through them in any lapse of ages.—Mr. R. Chambers took the same view: all our rivers were newer than the glacial epoch, and had done very little to modify the form of the surface. In Scotland as in America, the materials of the lowest river terraces were finer than in the upper; but he believed the true reason was, that it had been brought from a greater distance.—Gen. Portlock also argued that the case of Niagara and other American cataracts could not be used to explain ordinary river-valleys; he doubted whether the boulder clay was continuous below the river-terraces of Prof. Hitchcock.—Prof. Nicol quoted a remark of Playfair's, which seemed to favour the argument for attributing some valleys in Scotland to the agency of existing streams.—Mr. Strickland mentioned instances in Asia Minor where streams meandered through ravines 500 feet deep, cut by themselves in hard tertiary limestone.

'On the Constant Increase of Elevation of the Beds of Rivers, and on the earlier existence of the Binnen or Inland Lake,' by Dr. Becker.—It is well known that old buildings in river-side towns often appear as if they had partially sunk into the ground; churches sometimes have their floors beneath the level of surrounding streets, the basements of gates, towers, and ancient walls are buried up, and old pavements and quay steps are no longer visible. These circumstances are well illustrated at Mayence, a town 2,000 years old. About 1846 an ice-house was dug near the centre of the town through twenty feet of old building materials, charcoal, stones, mortar, &c., arranged in three strata of six feet each, covered by two feet of garden mould. In the lowest layer was discovered Roman coins of the time of Commodus, and bronze and earthen vessels of a Roman dwelling-house. In the next stratum, and conspicuously different in form and colour, were the remains of a house of the 14th century, with its coins and other works; above this were other coins and articles of the 16th century, and lastly a bullet mould, and the remains of materials of modern war. From these and similar observations in Cologne, Castel Bingen, &c. on the Rhine, Dr. Becker concludes that a town consisting of middle-sized houses would form a stratum of ruins about six feet thick. In these old towns the less durable class of buildings have been many times destroyed by fire or war, and reconstructed on the ruins of their predecessors, whilst the churches and other more substantial structures have stood through each change. Mayence also affords good evidence of a second cause of these phenomena, which are still in operation,—namely, the increase in the elevation of the bed of the Rhine. Close to the river, and forming part of the city walls, is the Fish-gate, built in 1050, and now so low as to be dangerous alike to loaded waggons and the heads of foot passengers;* recent excavations have brought to light the socle of the stone gate-pillars and the street pavement of 1050, nearly six feet lower than the present carriage way. On repairing the river quay near this gate two strata of road paving were found, —one 2½ feet and one 6 feet below the present way. From a variety of other indications, it is inferred that the bed of the Rhine was lower than it is now, at the commencement of our era by 13 feet; in 1050, by 5 feet 9 inches; and in 1750, by 8⅝ inches. The rising of the bed of the Rhine has been attended with a corresponding rise of its waters, and the flooding of the neighbouring lands has only been prevented by raising their banks from time to time. M. Becker concludes by recommending that flood-water should be admitted to marsh lands whenever it is practicable, that it may deposit its sediment there.—2. As to the existence of the Binnen or Inland Lake, which formerly covered the Rhine valley from Strasburg to Bingen. To the epoch of this traditionary lake, M. Becker attributes a line of ancient water level, marked by small precipices and beds of diluvial loam and pebbles, 115 feet above the present river. In 1846 a hill side in Mayence was lowered, and exhibited at the depth of fifty feet a bed of clay with innumerable fishes of the genus Perca, amongst others *P. Moguntina v. Meyer*, also fragments of crocodiles, tortoises, microtherium, &c. In these tertiary beds were hollows or crevices 10 to 30 feet wide and 20 to 50 feet deep, filled with sand and gravel, containing bones of the horse, deer, marmot, &c. These deposits, filling ancient crevices more than 100 feet above the Rhine, are regarded as further indications of the Inland Lake, whose outlet was apparently at Bingen, over a barrier since removed. Boring experiments at the confluence of the Maine and Rhine showed nothing but alluvium to a depth of 240 feet, a thickness which, according to M. Becker's calculation, would require 30,000 years for its formation.

* Since this paper was written the arch of the gate has been removed.

'On a Tertiary Fossiliferous Deposit underlying Basalt in the Island of Mull,' by the Duke of Argyll.—The island consists of trap, granite, and mica slate, all of which are seen in the small bay near Ardtun, and at this place are some small veins of coals interstratified with columnar basalt. A little north of the bay is Ardtun Head, a perpendicular cliff of 130 feet, intersected by a deep fissure or ravine, accessible from the moor above. The cliff consists of the following horizontal beds:—1. At the top, 20 or 30 feet of rudely columnar basalt; 2. A thin laminated stratum containing fossil leaves; 3. Volcanic ashes; 4. A second leaf-bed; 5. A second bed of volcanic ashes; 6. A third leaf-bed; 7. Amorphous basalt; 8. Columnar basalt, occupying the base of the cliff. The volcanic ash-beds are undistinguishable from some modern formations at Vesuvius, and from the tuff at Madeira and Auvergne. The second leaf bed is 1½ to 2 feet thick, and in its lower part is a mere mass of vegetation. In the third bed the leaves are less numerous, and imbedded in a volcanic mud, which now forms a hard whinstone; the leaves are black and look charred, but this is not necessarily the case: no trunks, boles, or even small twigs were found. From these appearances the Duke concluded that the leaves had accumulated from autumn to autumn in a shallow lake, and had been overflowed by soft mud, in which they were preserved. The only indication of living animals found with the leaves was the track of a worm. Chalk flints were found entangled in the trap; and on the neighbouring island of Tiree pieces of undoubted pumice were obtained. The Duke also mentioned that the first recorded visit to this spot was paid by Dr. Johnson in 1773. In 1790 Mr. Mills (Phil. Trans.) visited the ravine, but did not notice the leaf-beds; and subsequently, Dr. M'Culloch and Prof. Jameson had coasted the island, and supposed the horizontal ash-beds were secondary strata.

Prof. Forbes stated that the leaves were in a very beautiful state of preservation, and belonged to species of plane, alder, pine, equisetum, and some others. From the presence of flints the deposit appeared to be newer than the chalk, whilst in the latest tertiaries only vegetable remains of a more boreal character were found. The leaves most resembled some eocene specimens from Styria, figured by Dr. Unger, and those found in the (eocene) pipe-clay beds of the Isle of Wight. Sir John Richardson had also discovered leaves of similar character at Mackenzie River, Arctic America. With respect to their situation, fossil leaves had been found in beds under basalt in Iceland; and Prof. Oldham had just mentioned to him, that he found vegetable remains and leaves in a similar situation in the north of Ireland, but neither of these cases had been examined or published.—Mr. J. Smith said that the only clue to the discovery the Duke had made was the accidental finding of a "stone that looked like a leaf" by a sportsman.—Mr. Sedgwick, referring to the idea that dicotyledonous leaves (unless coniferous) were unknown in secondary strata, said that he had found such in the greensand bordering the Hartz mountains. The trap rocks of the Hebrides had been considered of older tertiary date by Buckland and Conybeare thirty years since.

Sir R. I. Murchison exhibited and explained a 'Geological Sketch-map of Spain,' communicated by M. E. De Verneuil.—In the centre of Spain are three conspicuous mountain chains,—the Guadarrama, the Monte de Toledo, and the Sierra Morena, all elevated before the secondary period, and having a direction a little S. of W. The Guadarrama consists of granite, gneiss, and crystalline schists; the Sierra Nevada, of mica, schist, and metamorphic nodes; the Sierra Morena and Monte de Toledo consist of Palæozoic strata, and Silurian fossils have been discovered in the former. In a section from Almadon to Cordova (from N. to S.), the strata succeed in an ascending order: the oldest slates contain Silurian trilobites, *Calymene Tristani* (which has been found at places 50 miles apart, on the strike of these beds, which is E. and W.), and species of *Cheirurus, Illænus* and *Phacops, Ogygia Buchii* and *Bellerophon bilobatus*

corresponding to Barrande's *third* series of Trilobites in Bohemia. About 20 miles N.E. of Cordova, the upper Silurian is represented by beds of calcareous concretions, containing *Cardiolæ* and *Orthocerata*. Devonian strata occur both N. and S. of Almadon, including the quartzites and schists of the mercury mines*; fossils of the genera *Productus*, *Leptæna*, *Spirifer*, &c. were enumerated. Carboniferous deposits are found further south, consisting of masses of limestone with *Productus semi-reticulatus*, and true coal-measures, of great value, but little worked for want of roads. The Sierra Cantabrica has an axis of Devonian rocks with fossils; and on its southern flank is the richest coalfield in Spain; the beds are vertical, but can be worked in the mountains 1,200 feet or 1,300 feet above the level of the streams; there are more than eighty workable beds, and the total thickness of the system must be 10,000 feet or 10,200 feet. The red magnesian limestone and gypsiferous marls of Montiel have been doubtfully referred to the *Permian* system. In this formation are the caves of Montesinos, explored by Don Quixote. The *Trias* has been traced from the Pyrenees to Santander, Asturias, and Leon, on both sides of the Cantabrian chain; it also occurs east of Madrid. *Jurassic* and *Cretaceous* formations extend over much of eastern and southern Spain, lying on the Trias, and constituting most of the high land east of Madrid. In Portugal, according to Mr. Sharpe, they are confined to the coast. In the south of Spain (Malaga and Ronda), these rocks have become so metamorphic that it is difficult to distinguish one from the other. Most of the Jurassic beds belong to the upper lias, characterized by *Ammonites Walcotti* and *Spirifer carrosus*. The cretaceous system of Spain consists of the Hippurite limestone, or equivalent of the lower chalk, and of the equivalent of the green-sand, well developed in Santander and Biscay. Above the chalk is the *nummulitic rock*, now considered Eocene, seen at Santander, and containing *Conoclypus conoideus* and *Serpula spirulea*. Nummulites are also found at Malaga, Motril, Tarragone, Olot, &c. The *Miocene tertiary strata*, chiefly of freshwater origin, are generally horizontal, extending as vast plains over Old and New Castile, from the Cantabrian chain to the Guadarrama, and from this to the Sierra Morena, sometimes reaching an altitude of 2,500 feet. The most recent beds contain living freshwater shells and bones of the elephant, near Madrid.†

'Notes on the Geology of the Southern Extremity of Cantyre, Argyleshire,' by Prof. Nicol.—The peninsula of Cantyre is connected with the mainland by an isthmus only a mile broad, and a depression of a few feet would convert it into several islands. The fundamental rock is an arenaceous mica slate, which runs nearly N. and S., and dips about 30° E. The red sandstone and conglomerates rest upon it almost conformably; the conglomerate attains an immense thickness, and consists of sand, pebbles, and rounded blocks, sometimes three feet or more in diameter; the blocks consist of porphyry, sandstone, hornstone, quartz, and trap, all of local origin. The red sandstone above is often almost a tufa of re-composed claystone-porphyry. West of Campbeltown some beds of coal are wrought; it contains Stigmariæ, Sigillariæ, and Lepidodendra; with the coal are beds of porphyry and green-stone, by which it is singularly altered. In the cliffs south of Tosset some splendid veins of trap are seen, rising up through the mica slate, sandstone, limestone, and shale, and spreading out in the overlying beds. On the shore at Kilhousland is a mass of trap like a miniature Giant's Causeway; the vertical columns are divided by veins of calc spar, hæmatite and malachite. No lias or oolitic coal was seen, as represented by Dr. M'Culloch, but there is a large mass of ordinary red till or boulder clay, with shingle beds above, often forming terraces. In the hollows of this drift are masses of peat, of great antiquity, and still increasing; leaves of the alder and other trees, nuts, &c. occur in the peat, whilst roots of birch and oak are found in the red clay beneath. All round the shore are cliffs and caves above the present level of the sea. Two caves in the hard porphyry of Davar Island are 130 feet long, meeting in the interior. Regarding the mica slate of the Grampians as altered Silurian rocks, the author suggests that the arenaceous mica slate of Cantyre may be newer Silurian or Devonian rock in a similarly metamorphosed condition. The discovery of the large mass of trap (coloured as mica slate by M'Culloch) brings Cantyre into parallelism with the south of Arran, and completes the band of igneous rock, commencing near Montrose, ranging across Scotland, and reappearing on the north of Ireland.

Dr. Fleming remarked, that the interval between columns of basalt, amounting sometimes to six inches, indicated a remarkable degree of contraction on cooling.

'On the Representatives of the Mountain Limestone as they occur on the south and east of Dumfries-shire,' by Mr. R. Harkness.—This stratum was described as consisting of three divisions:—1. The lowest beds, hard white grits, 350 yards thick; 2. White and red sandstone, flagstone, limestone, ironstone, and thin seams of coal and slate, above 300 yards; 3. Variegated grits and conglomerates, from 150 to 200 yards. The hills formed by these strata are low and flat-topped, and the grit beds are exceedingly sterile, producing only gorse and heather, contrasting with the fine pasture of the sheep-walks on the tracts occupied by the altered Silurian strata.

Mr. Harkness exhibited a drawing of the footprints of a biped from the new red sandstone of Western Point, Dumfries;—and Sir W. Jardine gave an account of the foot-prints in the same formation at Corncockle Mines, in the vale of the Annan, first noticed by Dr. Duncan, and described and figured by Dr. Buckland in the Bridgewater Treatise, where he compares them to the foot-prints of tortoises. The tracks run mostly in an east and west direction, as if the creature had made periodical journeys across the sands at low water.

TUESDAY.

'On the Geological Position of the Black Slates of the Menai Straits,' by Prof. Ramsay.—The Professor exhibited a map of North Wales geologically coloured, and explained his reasons for regarding these black slates of the Menai as the equivalents of the "*Lingula* beds" of Prof. Sedgwick. He stated that the purple slates and sandstones of Llanberris were 3,000 or 4,000 feet thick, and overlaid by beds containing *Lingulæ*, interstratified with "volcanic ash" and feldspar porphyries, the whole being 10,000 or 12,000 feet thick. Near Bala there were small beds of this volcanic ash, two or three feet thick, overlaid by the Bala limestone; but these beds became more important westward, until they attained a thickness of several thousand feet. The summit of Snowdon was formed of them. He then pointed out that the trap-rocks of North Wales were of three dates:—1st, contemporaneous traps; 2nd, greenstones, at first appearing as if interstratified but in reality injected along lines of bedding; 3rd, great ruptive masses, such as those in the Horn of Caernarvon. The chlorite and mica slate of Caernarvon were probably altered Cambrian rocks. Their metamorphic condition had been induced at a very early period, since pebbles of them were found in the lower old red sandstone and pebbles of the trap rock in the carboniferous limestone.

Prof. Sedgwick said that he had explored North Wales before the labours of the Survey commenced, and had arrived at and published most of these results; however, he was glad that what he had sketched out was being now done in detail, and that points of which he was doubtful were now being rendered certain. He objected to the term "volcanic ash," as being already in use for sub-aerial deposits, whilst these were plutonic.

'On the Parallel between the Superficial Deposits of the Basin of Switzerland and those of the Valley of the Po, in Piedmont,' by MM. Martins and Gastaldi.—1. *Ancient moraines.* In proceeding from the higher to the lower ground in both basins they met with numerous ridges, formed of erratic blocks, striated pebbles from the Alps, sand, gravel and clay mixed together, without any trace of stratification, indicating the long existence of glaciers. In Switzerland, Berne, Sursee, and other towns are built on moraines; and examples were seen in the great moraine of Mont Sion, between Geneva and Annecy, and that of the ancient glacier of the Rhone, extending from Fort Ecluse to Soleure, along the eastern declivity of Jura. In Piedmont, the moraine of Rivoli, at the opening of the valley of Susa, that of Ivrea formed by the ancient glacier descending from Mont Blanc, Mont Rose, and Mont Coque, filling the valley of Aoste and extending over the plains as far as Calasso. 2. *Scattered erratic formation*, composed of gigantic angular blocks from the Alps, gravel with striated angular pebbles, and mud, brought down by the glaciers at the period of their greatest extension. In Piedmont it forms a band round the moraine, and is seen on the hill of Superga. In Switzerland it covers all the plain, from the lake of Geneva to the lake of Constance and penetrates the valley of Jura. 3. *Glacier diluvium*, formed of rolled and rounded pebbles from the Alps, which are never striated; it is sometimes stratified, but without fossils. It covers a great part of the basin of Switzerland, and is very deep round Geneva and Berne. The authors attributed its origin to the fusion of glaciers at the period of their oscillations. 4. *Ancient alluvium*, with small rolled pebbles, not derived from the Alps, and bones of pachyderms, *Elephas primigenius*, *Rhinoceros tichorhinus*, *Bos priscus*, *Cervus euryceros*, &c. In Switzerland it rests on miocene molasse, and in Piedmont on marine pliocene beds. Northern Europe and America having been submerged at this period, many marine deposits were accumulated of the same age with these glacier formations.

'On recent Changes of Sea Level,' by Mr. R. Austen.—After remarking that many phenomena formerly classed as "raised marine beds or beaches" are now referred to distinct periods of time, the author proceeds to describe evidences of a former line of sea level on the headland west of Falmouth harbour. This "raised beach" is only eight or ten feet above the existing beach, and therefore partly within the influence of the present tides, which rise eighteen feet above low-water mark.

'Additional Observations on the Temperature of Mines in Ireland,' by Prof. Oldham.—Alluding to the former report, the deepest mine in Ireland was only 800 feet, and the increase of temperature, making all requisite allowances, amounted to only 1° for every 85 feet below the level of no variation; whilst in England and on the Continent the average increase was 1° for every 45 feet. Since then the same mine has been deepened to 1,200 feet and new observations have been made, but the results were the same. In another and older part of the same mine, 300 yards distant and 50 fathoms deep, the increase of temperature was ascertained to be 1° for every 52 feet.

A paper was communicated by the Rev. P. B. Brodie, 'On the Inferior Oolite near Grantham.' (Not read, but recommended to be transferred to the Geological Society.)

'On certain extraordinary Peculiarities of Structure in the more ancient Ganoids,' by Mr. H. Miller.—The fishes exhibited and described were obtained from the lower part of the old red sandstone in Scotland; they were in a very complete state of preservation and some of them entirely new or but imperfectly known from Russian specimens.

'On the Palæozoic Rocks of the South of Scotland,' by Prof. Sedgwick.—After describing the developement of the Silurian rocks in Cumberland, the Professor pointed out their parallels in the great chain of graywacke, of which the Lammermuir forms part; in the central part, or axis of the chain, the rocks consisted of coarser materials, and were more contorted, as at St. Abb's Head, whilst the newer rocks, both on the north and south, had a generally lower inclination.

Sir R. I. Murchison announced to the Meeting that M. Barrande was preparing a work on the Silurian rocks of Bohemia, and explained that in Bohemia they formed but a small basin, about 25 miles across, but abounding in fossils, and exhibiting an older series of organic remains than any known in England. Thus, although M. Barrande was no species-maker, but had united many which his precursors had considered distinct, he still possessed 250 species of trilobites alone; and amongst these he had discovered sexual differences and changes in the course of growth.

Dr. Anderson exhibited a collection of fishes from the yellow sandstone of Dura Den, and pointed out

* The mercury is not in veins, but dispersed through vertical strata of sandstone and carbonaceous slates; in the Asturias it occurs in coal-measure strata.

† There are three districts of *extinct volcanoes* in the Peninsula,—one at the Cape of Gata, one near Ciudad Real, and the third near Olot, in Catalonia.

the geological relation of these beds, which he said were 10,000 ft. above the beds from which Mr. Hugh Miller obtained his ichthyolites.

Prof. Forbes exhibited some plates of remarkable Fossil Radiata, engraved for the Decades of the Geological Survey.

Prof. Parlatore, of Florence, communicated an account of the discovery of Fossil Plants, apparently carboniferous (*Pecopteris arborescens* and *Annularia longifolia*), in the *Verrucano*, a sandstone rock, inferior to the real Oxfordian limestone, and hitherto considered unfossiliferous; they were found by Prof. Meneghini and Prof. Paolo Savi, of Pisa.

Lieut. Strachey, Bengal Engineers, exhibited a large Map of the Himalaya and Plain of Thibet, and gave a sketch of the geology of the country. In this plateau, which averages 15,500 ft., Lieut. Strachey has discovered the same series of fossils with those obtained by Major Cautley and Dr. Falconer, in the Sub-Himalaya. The plateau consists chiefly of boulder-drift in horizontal strata; whilst the high inclination of the tertiary beds shows that the great mass of the Himalaya is of post-tertiary elevation. The plateau is devoid of trees, and supports only a scanty vegetation over a very small part of its surface; as there is no water, it is almost uninhabited, except by nomade tribes, whose villages are in the ravines. Fishes (of a species not determined) are found in the lake and streams of the plateau. The ravines that intersect the plain are very extraordinary; that of the Sutlej is 3,000 ft. deep, and its sides have been mistaken for mountains; indeed, Moorcroft did not discover the existence of the plain on his first passage to Thibet. Lieut. Strachey has not detected signs of river action more than 200 ft. above the present streams, and considers that they have had little influence in forming these vast chasms. The glaciers exhibit signs of former extension, but of very inconsiderable amount.

Gen. Portlock described conglomerates of the old red sandstone between Tantallon Castle and North Berwick, which exhibit a metamorphic condition when in contact with the trap rocks, and become less so as they recede from them.

'On a Quartz Formation in the South of Scotland,' by Mr. W. Stevenson.—The Secretary, Mr. H. Miller, remarked that it was probably an altered sandstone like the quartz rock of the Lickey and Stiper stones, which was altered Caradoc sandstone.

'Notices of Earthquakes in South America in the Years 1844, 5, 6, 7,' by Dr. M. Hamilton.—The paper was not read, but the following is a brief abstract. In 1843 the writer took with him to Peru a seismometer from the British Association, and a mountain barometer, placing the latter at Tacna, where it remained from 1843 to 1846; no very destructive earthquakes occurred in these four years, and hardly any variation appeared in the barometer. The writer says, that "brief notice may be taken of the seismometer, and as to the pendulum it was of little use for ascertaining the direction or points whence the shocks originated; but the sand-glass instrument acted well, and realized expectations in its workings," indicating an upward heaving of the ground even in very gentle shocks. Delicate instruments, for the slight earthquakes, are most wanted, for violent shocks afford evidence readily: thus it often occurred at Tacna that the church bell tolled through lateral movements in shocks considered moderate. From other parts of America Dr. Hamilton received accounts of many destructive convulsions. On the 18th of October, 1844, at 10½ P.M., the provinces of Salta, Tucuman, Santiago-del-Estero, and others experienced a terrible earthquake, which was felt over a tract above 1,000 miles N. and S. and several hundred miles wide; every house in Salta was damaged, and many fell; on some estates the subterranean tanks of cane-juice were destroyed. At Xuxuy and Tucuman the earthquake happened at the same time, reducing those towns to ruin; there were two great movements, and in the suburbs of Salta and other places the earth opened and exploded quantities of water and various coloured sands. Before the concussion dogs began to bark, and beasts of burden to stop and place themselves firmly; the air was profoundly calm; after the earthquake heavy rain fell till sunrise. On the 26th of November, 1846, a new volcano in Chili appeared in action; its first eruption was preceded by many loud reports, heard over a circumference of twelve leagues; it was on one of the highest points of the Cordillera, known as the Cerro Azur, thirty leagues from Talca, at which distance the sulphurous smell of the eruption was perceptible.—Jan. 19, 1847, A severe earthquake at Copiapo, which threw down many houses and damaged all the town; fourteen shocks occurred within four hours after the first; they were mostly vertical, and considered the worst since 1822. On the 24th of May, 1847, a violent movement of the sea in the bay of Callo, and vessels anchored near shore were endangered; this submarine earthquake was felt on board an American whaler, distant sixty miles W.S.W. from the island of San Lorenzo.—June 4, 1847, The town of Huancarania, Talavera, and other places were visited by an earthquake.—June 23, A severe earthquake at Ica, continuing at intervals for two days, with shocks both vibratory and vertical.—Sept. 11, Tacna was visited by a violent earthquake, with both a vertical movement and an oscillation of the land; rain fell during the whole of the previous day, and continued during the 11th; the barometer fell $\frac{1}{30}$ before the shock. Two shocks were felt at Arequipa on the same day and hour, a direct distance of 200 miles.—Oct. 8, An earthquake was felt throughout Chili, from N. to S., and most severely at Melepilla, where it continued two days, and several hundred shocks were distinguishable; it was the worst since 1822. Many persons in Peru were of opinion that a disagreeable odour or state of the atmosphere might be perceived before any serious earthquake; between 1843 and 1846 this phenomenon was more rarely noticed than in 1826 and other years remarkable for earthquakes. Another indication of a coming shock is said to be the profoundly calm and stagnant condition of the atmosphere; these and other premonitory symptoms are worthy of diligent observation, seeing how much these visitations affect life and property.

Mr. A. Rose exhibited a specimen of Plumbago, from the Island of Mull, in the Hebrides, where it was discovered last June by Mr. C. M. Barstow, on the estate of Killimore, north side of Loch Scriden. It occurs in detached masses, from a few inches to a foot or eighteen inches across, imbedded in trap, or perhaps metamorphic rock, over an area probably half a mile square and 150 feet thick. Some attempts at blasting with gunpowder had been made, and the mass exhibited, which weighed 30 lb., had been obtained with about as much more in fragments.

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FRIDAY.

SECTION D.—NATURAL HISTORY, INCLUDING PHYSIOLOGY.

The President on taking the chair announced that on account of the large number of physiological papers it had been found necessary to constitute a Sub-Section of Physiology, and that Prof. Bennett had been appointed President.

Prof. Owen gave an exposition of his views upon the nature of the segments of the vertebrate skull. His remarks were illustrated by a series of preparations of the skulls of the various forms of vertebrate animals.

Dr. Lankester read a letter from Mr. G. Newport, 'On the reciprocal Relations of the Vital and Physical Forces.'—The author stated that as early as November 1845, he had advocated in a paper read before the Linnean Society, and published in an abstract of that paper at the time in the *Athenæum* and *Gardeners' Chronicle*, views similar to those which had since been advocated by Prof. Matteucci, Dr. Fowler, and Dr. Carpenter. These views were considered by the Council of the Linnean Society as of too startling a nature to admit of publication without further evidence, and they had accordingly omitted all reference to the subject in Mr. Newport's paper as published in their Transactions. The report of the proceedings of the Linnean Society in the *Athenæum* and *Gardeners' Chronicle* was read to the Section, as well as the original passage from the paper as presented to the Linnean Society. Some new remarks of Mr. Newport on the subject were subsequently read at the Physiological Sub-Section.

Dr. Carpenter stated that it frequently occurred that such was the condition of science that the same thought occurred to many observers at the same time. He freely admitted that Mr. Newport had preceded him in pointing out the correlation of vital and physical forces. It was due, however, to Dr. Fowler to say that fifty years ago he had prosecuted researches on this subject. There was, however, a great difference between the idea of the correlation of physical and vital forces and the mere hypothesis of their identity. The investigation of their correlations was likely to lead to important results. Mr. Grove had the merit of first appreciating the importance of studying the correlation of physical forces; but this was no less obvious between such forces as motion, chemical affinity, heat, light, magnetism, and electricity, than between these and various forces observed in the animal body, as the nerve force, muscle force, &c.—Dr. Fowler stated that his earliest experiments were made in Edinburgh in 1792.

Prof. Parlatore, of Florence, made some remarks in French, 'On some Peculiar Bodies which occur in *Aldrovanda vesiculosa*, *Utricularieæ*, and other aquatic plants.'—The author described minutely the structure of the intercellular cavities of the above mentioned plants, as well as those of Pontederæ, the species of Nymphæaceæ, &c., also the structure of some peculiar irregular bodies of a stellate form lying in the interior of the cavities, more especially in Nuphar and Nymphæa, and crystalline bodies in Myriophyllum.

Dr. Daubeny gave an account of the experiments he was carrying on, at the request of the Association, 'On the Action of Carbonic Acid on Plants.' These experiments were not yet concluded; but the result of his experiments was, at present, that when plants of the fern tribe were supplied with water containing 1 per cent. of carbonic acid, that they grew much more luxuriously than those which were supplied with pure water,—so that the conclusion might be come to, that although very large quantities of carbonic acid were injurious to plants, yet that when present in water from 1 to 5 per cent. it was beneficial.

Profs. Kelland and Goodsir successively addressed the Meeting on the subject of Mr. D. R. Hay's views of the geometrical principles of Beauty in general, and more particularly as applied to architecture and the human form. Prof. Kelland gave an exposition of the geometrical principles, and Prof. Goodsir confined himself to the explanation of the anatomical part of the question. The fundamental principles thus elucidated were as follows:—That the eye is capable of appreciating the exact subdivision of spaces, just as the ear is capable of appreciating the exact subdivisions of intervals of time; so that the division of space into an exact number of equal parts will affect the eye agreeably in the same way that the division of the time of vibration in music, into an exact number of equal parts, agreeably affects the ear. But the question now arises, What spaces does the eye most readily divide? It was stated that the author supposes those spaces to be angles, not lines; believing that the eye is more affected by direction than by distance. The basis of his theory, accordingly, is, that bodies are agreeable to the eye, so far as symmetry is concerned, whenever the principal angles are exact submultiples of some common fundamental angle. According to this theory we should expect to find, that spaces, in which the prominent lines are horizontal and vertical lines, will be agreeable to the eye when all the principal parallelograms fulfil the condition that the diagonals make with the side angles which are exact submultiples of one or of a few right angles. The author was stated to proceed to apply his theory to the construction of the human figure, in which we should expect *à priori* to find the most perfect developement of symmetric beauty. Diagrams were exhibited which represent, with remarkable accuracy, the human figure; and it was explained that not a single lineal measure was employed in their construction. The line which shall represent the height of the figure being once assumed, every other line is determined by means of angles alone. For the female figure, those angles are, one-half, one-third, one-fourth, one-fifth, one-sixth, one-seventh, and one-eighth of a right angle, and no others. It must be evident, therefore, that, admitting the supposition that the eye appreciates and approves of the equal division of the space about a point, this figure is the most perfect which can be conceived. Every line makes with every other line a good angle. The male figure was stated to be con-

structed upon the female figure by altering most of the angles in the proportion of 9 to 8; the proportion which the ordinary untempered flat seventh bears to the tonic.

Mr. Scott Russell was afraid that artists would not admit of such a mathematical definition of beauty as Mr. Hay was attempting to establish. Still that there was truth in the theory all analogy supported. A few centuries ago the philosopher would have laughed at the man who should have announced that the great irregular rocks of the earth and the stones on the road were all formed on mathematical principles, and yet every one knew now that such was the fact, and that the science of mineralogy used these mathematical forms as the basis of its classification. So in the plant, and so in the animal, are frequently found such regular repetition of the same form, and such perfect obedience to mathematical principles that it could but be felt that one day we should be able to reduce all typical beauty to mathematical forms.—Dr. R. G. Latham said that these researches of Mr. Hay were important as methods. He did not think, however, that we should get at the true form of beauty either by an *à priori* measurement or by appealing to any existing type. That was only really beautiful which mankind in all ages pronounced as such. We must always wait patiently for the judgment of the common sense of mankind, and we could only get a typical form of beauty in such a way.

'On the Infra-littoral Distribution of Marine Animals on the Southern, Northern and Western Shores of England and Scotland,' by Prof. E. Forbes.—In the year 1839, a Committee of the British Association was formed for the purpose of investigating the natural history of the British seas by means of the dredge. A chief object of the research proposed was the ascertaining of the exact relation of the Fauna of the British seas at the present epoch to that of the same area during the epoch of the so-called northern drift. A vast body of accurate observations and carefully stated facts have been obtained. This Report consisted chiefly of tables of two kinds. 1st. Tables systematically arranged of the species of animals dredged, all the depths at which they were taken during the inquiries, and the mineral character of the sea-beds on which they were found being stated in each species. These tables are extremely full, so far as Mollusca and Echinodermata are concerned, less so respecting other tribes of animals, but nevertheless more extensive than any yet made known. 2nd. Tabulated abstracts of the dredging papers, each separately abstracted; the year and place of observation, the distance from shore, the depth, the ground, the number of species of univalve testacea taken alive, and of those taken only dead; the same as regards bivalves. The number of species of Echinodermata, and Remarks under which the creatures taken most abundantly in each instance are recorded. More than a hundred papers, all relating to the district under report, are so abstracted. In these tables the region so explored is divided into ten provinces, five upon the English coasts and five on those of Scotland. These provinces are not arbitrary sections, but represent areas, each presenting peculiar geological features. The five English provinces are:—1. The coasts of Dorset and Hants, a region peopled from the general Fauna of the English Channel, but deficient in many of the species which give a character to the 2nd province, the coasts of Devon and Cornwall, where we have the most southern type of the Fauna of Great Britain, and the greatest number of Lusitanian forms appearing. 3. The Bristol Channel and southern shores of Wales, where we have a southern character still presented by the Fauna, but less intense. 4. The coast of North Wales, where we have the characteristic Fauna of the Irish Sea, marked more by deficiencies than by many peculiar species. 5. The seas around the Isle of Man, where the northern and southern types of the British marine Fauna, each faintly indicated, meet as it were in the middle of a region markedly of the British or Celtic type. 6. The region of the Clyde and the lochs which branch from it, an area of great interest, for in these great sea lakes we find as it were imprisoned assemblages of marine creatures which remind us of the inhabitants of the Arctic Seas, and strikingly of the population of the British Seas during the glacial epoch. 7. The seas of the inner Hebrides, presenting similar phenomena, but influenced by the currents of the North Atlantic. 8. The seas of the outer Hebrides and the district around Cape Wrath. 9. The Orkneys, where the peculiarities of the northern part of the German Ocean come in contact with those of the Atlantic regions,—and 10, the Zetland Isles, where we find the marine races of Britain mingled abundantly with creatures of unquestionably Scandinavian and Arctic parentage, not isolated or straggling, as those of similar character in the western provinces are, but seated at the true bounds of the great boreal province which here intersects the British Seas. The dredge has been used within the area reported on in all depths between four and a hundred fathoms. Everywhere do we find the distinction of Littoral, Laminarian and Coralline zones maintained, and in the Scottish provinces, that deeper region to which Prof. E. Forbes had previously given the name of "deep-sea coral," on account of the numbers and abundance of calcareous, zoophytic and bryozoic polypedons procured from the greater depths. Between the coasts of Cornwall and Ireland Mr. Mac Andrew has dredged and carefully noted the Mollusca inhabiting the region of fifty fathoms; and it is very curious and interesting to observe that only at such depths, and in peculiar localities, in the southern part of the British Seas, do we find those species of Scandinavian origin which give a feature to even the shallower zones in the sea-beds of North Britain. The tables now presented show that whilst certain species of marine creatures are absolutely restricted to defined provinces of depth, those of the Littoral and Laminarian zones being especially limited in range alters, and not a few have a power of enduring all the various conditions between the coast line and 100 fathoms, but in every case of wide range there is some portion in each region where the individuals of each species attain a maximum in number. The higher zones of our sea are distinguished by the presence of peculiar genera as well as species, but in the lower zones, the peculiarity is maintained almost entirely by peculiar species of genera, which have a wide bathymetrical range. According to the nature of the sea-bottom the proportion of species and of individuals of particular tribes of Mollusca and Radiata is determined. Among the former, the Acephalous species prevail over the Paracephalous in proportion to the more sandy or muddy character of the soundings, whilst the latter equal or exceed the former when the bottom is of mullipore, or hard, or abounding in stones of any size. A comparison of the species of Mollusca and Radiata, in the several provinces before enumerated, shows beyond question that there is a distinct distribution of them horizontally, and that the elements of our marine Fauna are derived from opposite directions, mingled, however, with a general assemblage, of which the British Seas may be regarded as the centre. To the influence of the Rennell's current we may attribute much of the southern element in our marine Fauna; to that of currents setting in from the north, the Scandinavian and arctic elements. But when all the cases of distribution clearly to be attributed to such influences are enumerated, there remains a residue which we can only explain by going back to epochs anterior to our own, and to a different conformation of the coast of Europe, and a different set of currents from those which now prevail.

'On the European Species of Echinus, and the Peculiarities of their Distribution,' by Prof. E. Forbes.—When the author published his account of the British Echinodermata, he laid great stress on the distinctive character furnished by the sculpture of the spines in each species. In this communication he endeavoured to show that these characters bear definite relations to the more important features of the organization of the test, and that through them we are enabled easily to recognize even the most aberrant varietics of each species.

Mr. H. E. Strickland read the Report of the Committee appointed for making experiments on the Vitality of Seeds. The experiments were going on, and the Committee would be glad to receive more seeds.

Dr. Daubeny stated that generally seeds enough were not sent; in order to carry on the experiments through a series of years, a large number of seeds should be sent, as many as two or three thousand. There was one thing which this Committee was succeeding in doing, and that was, abolishing the notion of the lengthened vitality of seeds which was very generally prevalent.

MONDAY.

'On the Influence of Salt on Vegetation,' by Dr. Voelcker.—This paper contained the result of a series of experiments on the influence of solutions of salt on various plants, as cabbages, beans, onions, lentils, chick-weed, groundsel, the thistle, radishes, and some grasses. None of these plants were affected during one month by solutions containing 24 grains of chloride of sodium to the pint of water, with the exception of *Anthoxanthum odoratum* which was killed. Cabbages, radishes and lentils were benefitted by this solution, and not injured by solutions containing 48 grains to the pint. Solutions of 96 grains injured the others, but had no effect on onions, radishes, and *Carduus pratensis*. Onions were not injured by solutions containing 192 grains of salt in the pint. Many of the plants had taken up so large quantities of salt that they tasted like strong brine.

Prof. Walker-Arnott said that some of the plants experimented on by Dr. Voelcker, although not exclusively sea-shore plants, were yet of a kind that would grow near the sea, as, for instance, *Poa annua;* and he knew as a fact that the seeds of plants which grew near the sea would bear larger quantities of salt than those of the same species which grew away from the sea.

'On the Epidermal Appendages of Callitriche, Hippuris, Pinguicula, and Drosera,' by Dr. Lankester.—The author stated that since he had described the stellate bodies covering the surface of Callitriche, he had discovered the same bodies in Hippuris. That these bodies were hairs and not stomates, as had been supposed, was proved, the author thought, by the occurrence of the same bodies in Pinguicula, which were elevated on cells so as to form the crown of a hair. He described also similar bodies on the surface of the so called hairs of *Drosera rotundifolia*.

Dr. Mackay, of Dublin, gave an account of an experiment on a *Dracæna Draco* (Dragon Tree) in the Botanic Garden of Trinity College, Dublin. The plant had grown too tall for the house in which it was in, the stem was gradually cut through four feet above the surface of the soil, and the upper part suspended in the air, when it sent down secondary roots, and eventually was planted again. The author thought that the same plan might be pursued with regard to the palms and other Endogenous plants when they became too tall for the house.

'On the Species of Gossypium, and the effects of Climate in altering the character of Cotton,' by Prof. Royle.—The author considered that the number of species of the cotton plant had been unnecessarily multiplied, and showed the great influence that climate has in modifying the characters of admitted species of Gossypium.

Dr. Lankester read a paper from Mr. G. Read, 'On the subject of Ropy Bread.'—This kind of bread, which is unpleasant and almost useless, is not unfrequent. It occurs at times throughout a whole district, and when once it gets into the bakehouse it is with difficulty expelled. The only way to get rid of it, is to cast away all the old materials of bread-making and use everything clean and new. When examined under the microscope, the bread was found to have lost much of its cellular character, and everywhere the presence of a minute fungus could be detected.

'On the genus Perodicticus of Bennett, and its relation to Stenops,' by Prof. Van der Hoeven.—The *Lemur Potto* of Gmelin, a species from the coast of Guinea, had hitherto only been known very imperfectly, the two specimens observed by the late Mr. Bennett and by the author of this notice having been both young and not having all their teeth. The author has had the opportunity of examining an adult specimen in the past year, and found the dentition quite similar to that of the genus Stenops.

Dr. H. Lowe made a Report 'On the Progress of Entomology in Scotland during the last few years.'—The Report was illustrated by a large collection of insects. Several insects recently added to the Scottish list were mentioned, and the author stated that in the destruction of insect life for preserving them

in museums, he had found nothing so successful as chloroform.

Report called for at the last Meeting of the Association 'On the Present State of our Knowledge of the Freshwater Polyzoa,' by Prof. Allman.—Freshwater Polyzoa have in a zoographical point of view been examined chiefly by Gervois and Van Beneden, on the Continent, and in this country by Sir J.G. Dalyell, while Van Beneden and Dumortier have given us valuable details of their anatomical structure, and recently Mr. Hancock has published an excellent paper on the anatomy of certain genera with descriptions of some new species. Still, however, much remained to be determined, and in the present report, Prof. Allman brought forward the result of several years' laborious research into this subject. In consequence of our increased knowledge of the Polyzoa and their separation from the Polypes, rigid exactness as well as facility of description required some reform in the terminology hitherto employed in speaking of these animals, and which contained several terms also applied to the Polypes, and consequently to parts in no respect homologous. The Report contains a detailed account of the anatomy of the different genera in which the dermal, digestive, respiratory, circulatory, muscular, nervous, and reproductive systems are described under distinct heads.

Prof. E. Forbes said that such papers as these afforded abundant evidence of the value of the services of the British Association to science. This report with many others, bringing up our knowledge of science to the present day, would not have been produced but for the Association.

'A List of Zoophytes found in the vicinity of Peterhead, N.B., with a notice of some new to the British list,' by C. W. Peach.—He commenced by stating that when he went to Peterhead in December last, he took with him a paper of Mr. J. M'Gillivray's containing a list of the zoophytes found on the coast of Aberdeen: this list he has verified with the exception of two, and, as well, added more than as many more, some of the flexible, amongst the rarest—the principal additions being calcareous, mostly Lepralias. He observed that many which are most abundant on the coast of Aberdeen, are either very rare or altogether wanting on the Cornish coast, and *vice versâ*. The list now contained 107 species, all of which he had carefully examined before admitting them to the list. The first new one which he mentioned is a Cellularia of great beauty, differing from all figured in Dr. Johnston's edition of the British zoophytes, in the shape and arrangement of the cells, and having one tooth on the upper edge of the cells induced him to propose the name of Unicornis. The next is an Actinia, which from its colour and markings he would name the Carnation.

Prof. E. Forbes gave an account of the zoological researches made by Messrs. M'Gillivray and Huxley during the voyage of H.M.S. Rattlesnake, under the command of the late Capt. Owen Stanley.

Mr. Busk then gave an account of the Zoophytes discovered on the same voyage—and afterwards a list of Zoophytes, &c. found at Port Natal, Algoa Bay and Table Bay, in South Africa—illustrated by a beautiful series of preparations of the animals described.

Prof. Fleming, Prof. Allman, and Prof. E. Forbes expressed their sense of the value of this paper, and their admiration of the manner in which the specimens had been prepared.

TUESDAY.

Dr. Carpenter read two papers—one 'On the Reparation of the Spines of Echinida,' the other 'On the Gigantic Foraminifera of the Eocene Period, and their existing Representatives.'

Prof. E. Forbes stated that with regard to the Marginipora and Orbitoides, the observations of Mr. Williamson had convinced him that they were true Foraminifera. At the time that he had maintained that they were Briozoa, no observations had been made that could be supposed to confirm their foraminiferous structure. Prof. Forbes then described a species of Foraminifera he had caught in the Zetlands, which projected from its head several apparent tentacula. He believed that an observation of this kind, in conjunction with the cephalopodoid character of the shell of some of the Foraminifera, had originally led D'Orbigny to suppose that these animals were Cephalopods.—Prof. Goodsir quoted the opinion of Dujardin, that the Foraminifera were related to the infusorial genus Amiba. These animals had the power of projecting lobes from their bodies, and probably in the same way as described in the creature seen by Prof. E. Forbes.

Dr. Carpenter exhibited a specimen of stamped gilt paper, prepared by Mr. Warren De la Rue, which he said, when held up to the light reflected it in various ways, in the same manner as the markings upon the shells of mollusca.

Dr. Mantell exhibited and described a portion of the upper jaw of the Iguanodon, with many mature teeth and dental grooves, which confirmed his opinion of the ruminant-like alternate arrangement of the teeth as given in his memoir on the Iguanodon in the Philosophical Transactions for 1848.—Prof. Goodsir could not, on so brief an examination as he had been able to make of the teeth, give an opinion as to their true character.

Prof. E. Forbes gave a short analysis of the researches of Mr. W. Thomson on the structure and management of the lingual teeth of the British Pulmono-branchiate Mollusca.

'On the Grass-cloth (Chū Inā) of India,' by Dr. H. Cleghorn.—The author stated that several species of plants belonging to the order Urticaceæ were employed in Hindostan for the purpose of yielding fibres used in the manufacture of textile fabrics. He exhibited several articles of dress very white and light, which were made from the fibres of an Urticaceous plant, the *Bohmeria nivea*.

Dr. D. Maclagan inquired if the fibres of this plant had been examined microscopically, as he had found that on being used for rubbing the glasses of optical instruments it scratched them. Should it become generally used in this country care must be taken to avoid its application to delicate objects.—Mr. Gourlie, of Glasgow stated that we knew very little of the raw material of many of the fabrics from other parts of the world. We were for a long time ignorant of the materials from which Manilla handkerchiefs were made. It was said to be the fibres of the leaf of the pine-apple, but we had not succeeded in manufacturing them in this country.—Dr. Lankester remarked on the importance of an increase of our knowledge of those forms of plants which were capable of yielding materials for manufacture. Although the exhibition of raw materials had been deprecated by some in the coming Exhibition of 1851, he believed that it might be made one of the most important and valuable features of the Exhibition.—Dr. Royle said that it had been long doubtful what plant yielded the grass cloth of India, and now that we know the plant, it would undoubtedly lead to its further employment. There were many other fabrics in India of which we knew nothing of the materials. He thought that one of the most important branches for the manufactures of this country of the Exhibition of 1851 was that of raw materials. Every pains should be taken to obtain the name and history of every species of plant which yielded any substance useful in the arts, manufactures or medicine.

Dr. D. Maclagan read a paper, from Mr. James Hardy, 'On an Acarus and Vibrio that attack Grasses.'

'On a peculiar Structure in the submedial pair of Rectrices of *Vidua paradisea*,' by Mr. H. E. Strickland.'—When these feathers are in a young state the barbs of both webs are united at their extremities to an intermediate filament, which becomes detached as the growth of the feather advances, and ultimately falls off. This filament is furnished on both sides with alternate tufts of "barbules," and these barbules possess hooked "barbicels," similar to those which exist on the distal side of the ordinary feather barbs. By means of these hooks the filament embraces and clasps the barbs which are attached to its two opposite sides. This structure appears to be peculiar to the *Vidua paradisea*, and to the submedial rectrices only in that bird. Its object is probably the protection of the feather-barbs during the course of their developement. But it is difficult to account for so complex a structure occurring in two feathers only, in a single species (so far as known) of birds.

'On the Birds of the Faroe Islands,' by Mr. J. Wolley.—In illustration of the abundance of certain kinds of food was mentioned the phenomenon of the sudden rise of a compact shoal of small marine animals, probably crustaceous; which, on the authority of an intelligent native, has given origin to the belief in the existence of the huge flat sea-monster, the Kraken of Pontoppidan, called in Faroe Krak or Teara-bue. The particulars given by the Bishop and those related by credulous eye-witnesses in the islands are mostly consonant with this explanation. Such are the choice of particular localities, the sea-weed bank appearance, the birds hovering over it, and the fishes feeding upon its dung, with the calmness and heat of the weather; the latter also necessary for a sight of another of the sea-monsters, the Soe-ormen,—for which the effects of electrical jets of air, little whirlwinds or water-spouts have undoubtedly been mistaken by at least some of Pontoppidan's witnesses. In a list of thirty-six birds found breeding in 1849, there were the names of only two not known to breed in Britain,—the Snow Bunting, *Emberiza nivalis*, and the Purple Sandpiper, *Tringa maritima*,—both of which frequent the tops of mountains.

Mr. A. Strickland read a paper, 'On the Changes of Colour undergone by British Birds.'

Dr. Lankester brought before the Section the following papers and reports:—1. 'A Record of the Distribution of Marine Animals in Depth in a Cruise from Vigo to Tunis,' by Mr. R. Mac Andrew.—The paper had been recommended by the Committee of the Section for publication entire in the next volume of the Transactions of the Association.—1. 'Report on the Structure and Forms of the family Annelida,' by Dr. T. Williams, of Swansea. Several drawings illustrated this report, which was still in progress; and the Committee had recommended that Dr. Williams be requested to continue his researches on the Annelida.—3. Report of a Committee for the Investigation of the Periodic Phenomena of Plants and Animals.' The Committee had had two sets of tables sent in during the present meeting, one from Mr. James Hardy, of Penmanshiel by Cockburnpath, the other from Mr. Matthew Moggridge, of Swansea. The Committee urged upon those who had applied for their tabular forms to retain them, as only a few accurate observations when concluded with others were of importance.

Mr. T. C. Thompson read a notice of the application of photography to the compound microscope.

Dr. Carpenter stated that he had used this plan himself for obtaining microscopic drawings: it had been first employed by the late Mr. Edwin Quekett.

Mr. Zaglas gave an exposition of his views of the Morphology of the muscular system. He showed that by tracing the developement of the muscles from the fishes up to the higher mammalia, there were certain general laws which governed their form and relationship one to another.

Prof. A. Thomson remarked on the novelty of the author's views. He saw no occasion why we should not have the same general laws applying to the muscular system as we found prevailing with regard to the nervous and osseous systems.—After some few remarks from the President, the Section was closed for the session.

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MONDAY.

SECTION F.—STATISTICS.

'Remarks suggested by an examination of the recent Statistics of the Cotton Manufacture in Great Britain,' by Mr. G. R. Porter.—The fear of being dependent upon foreign countries for the supply of any article of first necessity has often influenced the mind of the public, although the cases can be but very few in which that fear can have any just foundation. It must be evident, upon the slightest reflection, that if the industry and capital of any country have been applied to the production of any article, the market for which is habitually found in some other country, it must be at least as disastrous for the producing country to be deprived of its market as it could possibly be for the consuming country to have its supplies cut off. In point of fact, both countries would necessarily be placed by the interruption in the same condition of distress, since, to be in a condition to deal together, both must be producing and both consuming countries. There are circumstances, however, under which it might be unwise for a country to be willingly dependent upon another for the means of setting its industry in motion, viz., when the causes of the interruption that

will operate injuriously are beyond the control of the country of supply; and such a case actually exists in respect of the, to us, all-important article, cotton. Our supply of cotton has hitherto been drawn in very fluctuating proportions from British India, Brazil, Egypt, our West India Colonies, and the United States of America. From this last-named country the quantities were for a long series of years in a continual condition of increase. From Brazil our importations have sensibly lessened without any reasonable prospect of future increase. From Egypt the quantities fluctuate violently, and depend greatly upon causes not falling within ordinary commercial considerations. In the British West Indies the cultivation of cotton has for some time ceased to form a regular branch of industry, and it is hardly to be expected that having thus ceased to be profitable when prices in Europe were uniformly at a higher level than they have been for now a long series of years, the cultivation of cotton to any important extent will be resumed in these colonies. From British India the quantities received depend upon a different set of circumstances, but of such a nature as to forbid any very sanguine hope of great and permanent increase in the shipments. To those who reflect seriously upon these facts, it must appear a matter of grave importance how any continued failure of cotton crops is to be met; and not only so, but also, how a substitute is to be found for the hitherto constantly increasing amount of those crops; for it will not be enough to provide the same amount of employment as before for our continually growing numbers in a branch of industry which, by its ordinary operations, necessarily brings forward those increased numbers. The uneasiness which it is natural to feel under the circumstances here described, has led to the inquiry, as diligently and as carefully as opportunity has allowed, whether some substitute or auxiliary may not be called into action which shall meet the evil that threatens us; and this, it is suggested, may be found in a kindred branch of manufacture—that of flax. A very few years ago, when first anxiety began to arise concerning the prospects of our cotton manufacture, the resource which has just been named did not present itself. At that time, our linen manufacture had not made the progress by which it is at present marked—a progress proportionally equal to any that has been made at any time in the cotton manufacture. Hitherto we have, in this kingdom, been greatly dependent upon our foreign importations for supplies of flax; and while the law imposed restrictions upon the importation of grain for human food, there existed a kind of moral impediment in the way of increasing our home growth of articles for any purpose not of equal primary necessity. That impediment is now removed; and there can be no reason given why our fields should not be henceforth used for the production of any article that promises an adequate profit to the farmer. It is especially desirable so to apply the productive power of the soil for the supply of articles as indispensable to the support of millions of people as corn itself; and an additional inducement to the growth of flax beyond that offered by other articles, may be found in the fact that to bring it to the same condition as that in which it is usually imported from foreign countries, calls for the employment of a considerable amount of human labour. There is no part of the United Kingdom in which the flax plant cannot successfully be cultivated; and there is hardly any country where it might not be brought to supply our deficiencies, should such arise. It should not in any degree interfere with the prosperity of the present race of cotton manufacturers if flax were to be substituted in part for the material now employed by them. Some changes are doubtless necessary in order to adapt their present machinery for the spinning of flax, but not to any important extent; and the expense to which the proprietors might thus be subjected would be well compensated during the first year of short supply of cotton that might arise, by the security that they would feel in the future regularity of their operations; assured as they then would be against the irregularity of seasons, or those disturbances which have arisen, and which always may arise, to disarrange their operations and to interfere with the regular employment of their hands. It would not appear difficult so to order the arrangements of a spinning-wheel or a weaving shed that both flax and cotton might be included within its operations, and that the preponderance in those operations might be given from time to time either to the one or to the other, according to the capabilities of the markets of supply on the one hand, and the requirements of the markets of consumption on the other.

'On the Geographical Distribution of Disease, as indicating the Connexion between Natural Phenomena and Health and Longevity,' by Mr. K. Johnston.—In this paper, which was illustrated by maps and diagrams, the author gave general views of the distribution of endemic disease over the globe, showing, by means of colours, the regions visited by particular diseases, and the proportionate amount of mortality occasioned by each among natives and Europeans. He showed by means of diagrams the effect of climate in the production and extension of disease, as exhibited in the moist and marshy districts of tropical regions;—that, for example, remittent fever increases progressively with the increase of temperature from north to south; as strikingly shown by the returns of the health of the army of the United States of America. He stated, that in order to judge of the effects of climate, it is necessary to compare the amount of sickness and mortality among the indigenous population of a country with that of strangers to the soil; that in India the average amount of mortality among European troops is nearly three times as great as among natives. He then drew attention to the remarkable differences between the health of the army as compared with that of the navy and with the civil population of a country. After adverting to the successful means that have been adopted for the prevention of disease, and the greatly increased value of human life thence resulting, he intimated his intention of following up the important inquiries now commenced with a special view to the subject of life assurance.

'Account of the System of Croft Husbandry and the Reclamation of Waste Lands, chiefly by spade culture, adopted at Gairlock, in Ross-shire, since 1846, and its results, as illustrating the conditions under which the labour of paupers and criminals may safely be made productive,' by Dr. Alison.—The object of this paper was to establish chiefly by statistical evidences the following propositions:—That where the system of *petite culture* practised in Belgium had been introduced in the arable lands in Ross-shire,—*i. e.*, stall-feeding of stock, collection and economical management of manure, proper rotation of crops, and careful cultivation of small crofts by the spade,—the result had been almost exactly the same as in Belgium; viz., that a family of five persons could be maintained on such land, in comfort, on a croft of five or six acres, and pay a rent of 10*s.* or more to the landlord; and that the reclamation of arable but waste lands for this purpose could be effected in a very few years by the population now in their neighbourhood, under due regulations as to instruction and inspection. 2. That great tracts of such land now absolutely unproductive exist in Great Britain, and at least 1,500,000 acres in Ireland, known by official surveys to be at least equal to that in Belgium, requiring only a small outlay of capital for draining, &c., and large outlay of labour, to make them equally productive as that in Belgium or the best of those at Gairloch. 3. That the objections made to the productive employment of paupers or criminals on such land are in most such cases distinctly inapplicable; these objections being, first, that pauper farms generally prove failures, and are a loss instead of a profit to the parish; second, that the employment of paupers in any productive employment interferes with the labour market and injures independent labourers. To the first objection the answer made is, that it is not necessary in order to establish the importance of productive employment of paupers, that they should furnish a profit for the parish; they may be very usefully employed, even in a merely economical view, if they only effect a saving to the rate-payers, who must find, clothe, and lodge them and their families whether they employ them or not. To the second objection it is answered, that lands on which no work has been done within the memory of man are not in the labour market, and any production raised on them are clear additions to the wealth of a country, and no injury to any other labourers; and that all that sound political economy requires is, not that the labour of paupers (or of criminals) should yield no remuneration, but only that such remuneration as it does yield should be clear addition to the resources of a country, not the substitution of the produce of their labour for that of independent labourers. 4. That great numbers of able-bodied destitute poor have been maintained in the workhouses in Ireland since 1846 in absolute idleness, and at a great expense to the rate-payers there and to Britain likewise; that many have died in Ireland of the effects of destitution; and great numbers more have wandered thence, and caused expense and carried disease wherever the English language is spoken, who might have been employed in reclaiming these waste lands, with a saving, if not a profit, to those who have now to support them; examples having been recently furnished by the experience of several English unions—particularly Chorlton and Sheffield—of the reclamation of waste lands by pauper labour, with a decided saving to the parishes even within a very few years. 5. That when landed proprietors, as in Ireland, have their land occupied by a redundant and destitute population, for which they are legally bound to make some provision, their natural resource—as the best authorities, *e. g.* Mill, Sir R. Kane, and Mr. Nicholls, Poor Law Commissioner in Ireland, agree—ought to be, the establishment of the *petite culture*, as in Belgium, and as imitated at Gairloch; and that any law which impedes the sale of portions of their property for that purpose is truly a suicidal law, injurious to all the interests of the country. 6. That a poor law providing for the unemployed able-bodied, rightly worked, may be of the most direct and essential use in Ireland, or in any other country, in bringing the waste lands "and idle hands" together, and aiding the general establishment of this kind of husbandry—first, because numbers of the able-bodied paupers in any union may be employed immediately in reclaiming and then cultivating such lands taken possession of in default of payment of rates, or purchased or rented for this purpose, as has been done at Sheffield and at Chorlton; and, secondly, because such operations, carried on in every union in Ireland, and under the direction and control of such experienced agriculturists as Government may easily obtain for the purpose, may become a normal school for instructing owners and occupiers of land in a system of cultivation which requires little expenditure of capital even from the first, but some knowledge of the subject, and especially constant attention and industry, such as the examples of Gairloch as well as of the English unions show, may gradually be enforced among the people by the owners of the land and their agents, when themselves duly sensible of its advantages.

Prof. Hancock was of opinion that the employment of pauper labour would be a failure. It could not be made productive, and the poor-law guardians could not manage it. He held that if waste land was to be made productive, it should be undertaken by private enterprise. The waste land of Ireland, however, was completely locked up by the difficulty and expense of making out a title.—Mr. J. H. Burton said an important distinction should be kept in view on this subject—it was that between the employment of pauper labour in the mere reclamation of waste land under the labour test, and any approach to the system of colonizing such land with paupers. The latter system was liable to grave objections, to which the former did not seem amenable.

### TUESDAY.

Mr. W. T. Thompson made some observations with reference to an investigation of the fund established by Act of Parliament for a provision for the widows and children of the ministers of the Church of Scotland, and of the Principals and Masters of the Universities of Scotland, from 1744 to 1849.—Mr. Thompson divided his observations into two parts. The first related to the rate of interest on money in Scotland as invested by bond on landed security, comparing the result with the rate of interest on other classes of securities. The second related to the deaths and marriages, widows and families, and other similar statistics afforded by the fund. It appeared that the average rate of interest from 1784 to 1850 (66 years) was 4*l.* 7*s.* 7*d.* per cent.; the average rate of interest from 1816 to 1850 (34 years) was 4*l.* 4*s.* 5*d.* per cent.; the average rate of interest from 1830 to 1850 (20 years) was 3*l.* 19*s.* 10*d.* per cent. After drawing some general conclusions, the

author proceeded to state the result of his observations on the vital statistics of the fund. The period to which he directed particular attention was from 1797 to 1842—the former date being about the time when the fund attained its full proportions, and the latter being before its operations were disturbed by the secession from the Church in 1843. A few out of the leading results brought out were, that the average number of members during the period stated was 1,020; that the average age of the living was about 48·9; that the average age of entering the church was 28·9; that the average duration of the lives of the members after admission was 33·4 years; that the average duration of the life of each widow after her widowhood was 19 years; that the average number of widows existing at one time was 338; that the number of ministers who died yearly was on the average under 30.

'Some Statistics respecting the Sale of Incumbered Estates in Ireland,' by Prof. HANCOCK.—The questions he proposed to illustrate by his statistics were—1st. Did it appear that any necessity existed for establishing the cheap, simple, and expeditious forms of procedure of the Incumbered Estates Court in lieu of the proceedings previously required in the Courts of Chancery and Exchequer? 2nd. Was there any evidence of the parties most interested having confidence in the proceedings of the Court? 3rd. At what rate of purchase had the estates been really sold? 4th. To what causes were the differences of prices of the different classes of estates to be ascribed? As to the first question, it appeared, that of cases transferred from the courts of equity to the Incumbered Estates Court, no less than 89 cases had been pending in Chancery or Exchequer for 10 years; 40 cases for 20 years; 26 cases for 30 years; 13 cases for 40 years; 8 cases for 50 years; 5 cases for 60 years; and 1 case for 70 years. The result of this delay was to make the bulk of these estates bankrupt. It appeared that the estates owed the following sums:—

| | | | Incumbrances. | Possible Price. |
|---|---|---|---|---|
| 5 cases, | pending | 60 years, | £202,602 ..... | £176,700 |
| 9 | ... | 50 years, | 339,051 ..... | 258,480 |
| 13 | ... | 40 years, | 476,124 ..... | 341,480 |
| 26 | ... | 30 years, | 635,699 ..... | 444,250 |

In only 2 of the 26 estates would the proprietors receive any part of the purchase-money, and they would get only 18,000*l.*, leaving 422,000*l.* to pay incumbrancers having charges to the amount of 635,699*l.*; so that the incumbrancers must lose upwards of 200,000*l.* The effect of the rapid sales of the incumbered estates was not to ruin puisne incumbrancers, but to make manifest the ruin that the dilatory proceedings in equity had produced. As to the second question, it appeared that out of 1,003 petitions presented up to June last, 155 had been presented by the owners themselves, relating to a rental of 180,000*l.*, subject to incumbrances amounting to 2,892,000*l.* As to the third question, it appeared, that 25 sales of fee simple had produced 125,176*l.*, or a nominal rental of 7,872*l.*; or, making an abatement of 20 per cent. on a real rental of 5,658*l.*, being 22 years' purchase. That 13 sales of leases for lives renewable for ever had produced 22,930*l.* on a gross nominal rental of 2,285*l.*, subject to a head rent of 278*l.*; making an abatement of 20 per cent. to get the real rental of 1,814*l.*, and taking 30 years' purchase of the head rent as added to the purchase-money, this gave an average of 17 years' purchase. That 14 sales of long terms of years produced 33,155*l.* on a nominal rental of 4,195*l.*, subject to a head rent of 768*l.*, which gave an average of 16¼ years' purchase. That 6 sales of estates subject to annuities produced 57,285*l.*, on a nominal rental of 1,014*l.* In these cases, as the ages of the annuitants were not given, it was impossible to ascertain the rate of purchase. As to the fourth question, the difference of price of the land in fee and the leaseholds arose partly from renewal fines and the reservations and covenants in the leases, but was chiefly caused by the circumstance that in the case of leaseholds the Commissioners gave parliamentary title not to the land, but to the lease only; and consequently, parties buying leaseholds ran a risk of losing their purchase if it should turn out that the original lessor had no right to grant the lease, or if there was any technical defect in the lease. It followed, therefore, that the Incumbered Estates Court was absolutely necessary; that the owners of land had shown great confidence in it; that the land of Ireland was not depreciated, as it had brought 22 years' purchase; that the system of giving a Parliamentary title had prevented any depreciation from complication of title; that the want of a complete Parliamentary title in the case of leaseholds had caused a depreciation to the extent of nearly five years' purchase in their sale; and that this depreciation could be removed by wise legislation.

The SECRETARY read a paper by Mr. A. MILWARD, entitled, 'Some Remarks on the City and Neighbourhood of Malaga, and on the Preparation of Raisins.'

'On the recent Progress of Glasgow, in Population, Wealth, Commerce and Manufactures,' by Dr. J. STRANG.—In 1801, the population was 77,000; in 1821, 147,043; 1831, 202,426; 1841, 282,134; and in 1850 it was estimated to amount to 367,800. The population had thus quintupled itself in fifty years and doubled itself in twenty years. In 1845, the gross number of houses and other possessions was 65,028; and the rental 866,150*l.* In 1850, the number of possessions was 76,034; and the rental 1,017,362*l.*; showing an increase, in five years, of 11,006 possessions, and of 151,212*l.* of rental. In 1800 the streets and roads within the Parliamentary bounds of the city extended to 30 miles; at present the formed and paved streets alone extended to 96 miles. In 1800 there was little or no sewerage in Glasgow. At present there were 42 miles of main sewers, 21 of which had been formed during the last six years, at a cost of 1,200*l.* per mile. Dr. Strang then referred to the deepening of the river Clyde, and stated that in 1800, vessels of only some thirty or forty tons could come up to the Broomielaw. In 1820 the high water at neap tides was 9 feet; in 1840 it was 14 feet; and in 1850 it had increased to 16 feet, so that vessels of 1,000 tons register could come up to the harbour of Glasgow, while steam-ships of 2,000 tons had been built on the banks of the river near the city. The tonnage of vessels belonging to Glasgow was as follows.—

| | | | Sailing Vessels. | Steamers. |
|---|---|---|---|---|
| 1828 | .. | .. | 214,315 tons. | 481,946 tons. |
| 1848 | .. | .. | 271,942 ,, | 894,387 ,, |
| 1850 | .. | .. | 392,033 ,, | 873,159 ,, |

The decrease in the tonnage of steamers was to be accounted for by the trade having gone partly into railways. The revenue of the Clyde Trust in 1800 was 3,319*l.*; in 1820 it was 6,328*l.*; in 1830, 20,296*l.*; in 1840, 46,481*l.*; in 1850, 64,243*l.*; showing an increase of revenue twenty-fold since the commencement of the century, and three-fold during the last twenty years. The Customs duties in Glasgow, in 1801, were 469*l.*; in 1820, 11,000*l.*; in 1830, 59,013*l.*; in 1840, 468,974*l.*; and in 1850, 640,568*l.* The letters put in the Post Office in 1840 were 54,522; while in 1850, they were 111,504. Cotton-spinning was first introduced in Glasgow in 1792; and at present there were 1,800,000 spindles, which annually consumed 45,000,000 lb. of cotton. Dr. Strang then referred to the increase that had taken place in the consumption of gas and water—the former having been nearly quadrupled within the last ten years. The increase that has taken place in the assessment for the poor over the whole of Glasgow cannot be determined; but some idea may be formed of it from the state of matters in the old burgh of Glasgow. In 1784 it was 1,032*l.*; in 1816, 12,378*l.*; and in 1850, 47,787*l.* Taking the whole Parliamentary bounds of the city the annual assessment for the poor at present is 80,000*l.* The cost of prisons in 1820 was 1,058*l.*; but now it was 8,550*l.* The daily average of persons in prisons was 717; and the cost of their maintenance per head 12*l.* 1*s.* 3½*d.*

'On the Prevalence and Mortality of Cholera in the Indian Armies,' by Dr. C. FINCH.—The scope of this paper was to show that the disease was neither so frequent nor so fatal in the East as is generally believed in this part of the world. A summary of these per-centages show that of the European force, 11,429 strong, stationed in the Madras Presidency during the year 1847, there were attacked by cholera only ·271 per cent.,—little more than 1 man in 500; and of whom died ·192 per cent.,—less than 1 man in 500. Of the European troops, 8,756 strong, serving in the Bombay Presidency in 1847, there were sufferers from cholera ·515 per cent., or 1 man in 200; of whom died ·274 per cent., or about 1 man in 400. Of the Madras Native Army, consisting of 67,950 men, those attacked by cholera were ·334 per cent., or about 1 man in 300; of whom died only ·114 per cent., or 1 man in 900. Of the Bombay Native Army, comprising 43,930 sepoys, the ratio of sick to strength was ·575, or little more than 1 man in 200; but the loss occasioned by the disease did not exceed ·227 per cent., not amounting to 1 man in 400. These results demonstrate that though epidemic cholera is still a frequent and fatal disease in the Indian armies, it is neither so prevalent nor so mortal as it is generally believed to be, and show that military service in India does not necessarily entail so great a risk of life from this disease as is generally supposed in this part of the globe.

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### FRIDAY.

#### SECTION G.—MECHANICAL SCIENCE.

Mr. NASMYTH gave an account of his new arrangement of the reflecting telescope, by which great additional comfort was afforded to the observer. This consisted in having the centering or trunions at the centre of gravity; through one of which, in a tubular form, the rays from the reflector within were thrown into the eye thus placed, as in the Newtonian telescope at the side. The advantage from this arrangement is, that the eye does not require to move upon a movement of the telescope. Mr. Nasmyth then described his plan of casting specula, by which unsoundness was avoided.

Prof. SMITH explained a new form of equatorial at present constructing for the Edinburgh Observatory, and a folding dome for extra meridian instruments. After this he explained a mode of cooling the air in tropical climates. This was in the first instance to condense air by mechanical means. Then to allow the air thus condensed, and consequently heated, to fall to the common temperature. The condensed air thus let loose, and allowed to fall into a room, would, by its expansion, lower all the air with which it comes in contact. He had tested the principle on a large scale, and found it to answer his expectations.

Mr. TAYLOR knew of men working in one of the Cornwall mines at a temperature of 110°. It would now be possible to send them down a treat of cold air, which he had no doubt they would relish as much as a lady does an ice on a hot day.—Mr. RANKINE said, in reference to the power required, that he had made the calculation, and the result was, that one horse working for one hour lowers 9,000 cubic feet of air 20°; and, of course, in this proportion for all other cases. This was exclusive of friction.

'On a Register Hygrometer for regulating the Atmospheric Moisture of Houses,' by Mr. APPOLD.—This instrument, with a variation of one quarter of a degree in the hygrometric state of the atmosphere, opens a valve capable of supplying ten quarts of water per hour, conveying it on to the surface of warm pipes covered with blotting paper, by which the water is evaporated until the atmosphere is sufficiently saturated, and the valve thereby closed. A lead pencil attached registers the distance the hygrometer travels, and thus a sheet of paper moved by a clock would show the hygrometric state of the atmosphere at any period of time.

'On a Gas Stove,' by Mr. W. S. WARD.—The novelty of this consists in constructing the stove in a vertical position, so as to expose considerable surfaces for the absorption of heat from gas burners, and for the radiation of the heat. The author found that his apparatus was sufficient to raise the temperature of a moderate sized room from 5 to 10 deg. Fah., with a consumption of about 3 feet of gas per hour, costing about 2*d.* for ten hours; and that it was particularly useful in warming a bed-room, where only a slight elevation of temperature was required, and free from the production of dirt or smell.

### MONDAY.

Mr. LASSELL, of Liverpool, gave an account of his new method of supporting a large speculum free from sensible flexure in all positions. This he proposed to do when in a horizontal position, by supporting it at eighteen different points on which the weight might bear equally; and by casting the speculum with ribs, he proposed to adapt levers, that when the telescope is elevated, they might bear the weight among them, and thus prevent it from disturbing the true form of

the speculum.—The PRESIDENT of the Section said that the evil arising from flexure was much felt in Lord Rosse's telescope, and of course lay much in the way of its efficiency.

Mr. WHITWORTH'S communication 'On a New Duplex Turning-lathe,' was then read by Mr. Scott Russell.—The improvement suggested not only doubled the quantity of work, but did it in a much better style. It was to have two cutters on opposite sides of the cylinder to be turned, thus at once increasing the performance, and rendering that better by removing the tremor which would necessarily arise.

'On the Value of the Gaseous Escape from the Blast Furnaces at the Ystalfera Iron Works,' in continuation of a paper read at the meeting of the Association in 1848, by Mr. PALMER BUDD.—Mr. Budd stated that, since the meeting of the Association at Swansea, he had continued, and with increased success, to apply the waste gases that escaped from the top of blast furnaces, to the manufacture of iron; and it was the result of his further experience applied to the whole of his furnaces (nine in number) since that period, that he now wished to submit to the Section. Mr. Budd then referred to his mode of applying the gaseous escape, and said it was well known that there were two descriptions of furnaces used for metallurgic purposes. The one was the blast furnace, into which air was injected, by mechanical means, at a great density, so as to penetrate upwards of 40 feet of dense materials; and the other was the reverberatory furnace, where the fire was produced by means of the draught of a chimney stack. What he had accomplished was by combining these two, so that the gaseous products of the furnace, instead of escaping through the tunnel head, were drawn sideways by a high stack, and passing through the stoves and boilers, leave behind the necessary temperature of the blast and of the steam. In a blast furnace the ores are smelted before the *tuyères* by the conversion of the solid carbon into carbonic acid, which, passing up through the middle region of the furnace into a bath of carbon, was reconverted into carbonic oxide, capable of combining with a further dose of oxygen. It would be thus seen that the whole of the carbon of the fuel should be present at the top of the furnace in a gaseous form. When the British Association met at Swansea, he had not used the gaseous escape at any great distance from the furnace, his stoves and boilers being very closely contiguous. Further experience, however, had proved that by the aid of a stack at the end of the chain of sufficient dimensions, the gaseous escape from the furnace might be made to travel in the most tortuous directions, descending to the stoves built for heating by the usual fire-places, and traversing the boilers; the only condition absolutely necessary being that there should be an unbroken communication with the high stack at the end, into which the gaseous escape might at last pass, and by which it was drawn forward, instead of passing off wastefully at the tunnel-head. When, however, the draft was carried downward, and to long distances, he had found it necessary to drop into the top of the furnace a hopper or funnel, made of sheet-iron, which acted as a shield at the mouths of the horizontal flues, and prevented them from either being affected by high winds, or from being choked up by materials thrown into the furnace. The reason, no doubt, why this funnel was not applied before was the great apparent temperature at the funnel-head. In practice, however, it was found that until the gaseous escape mingled with the atmosphere, its heating power was not such as to injure sheet-iron, or even to make it red-hot. In fact, so long as there was an escape upwards, the iron funnel would not be injured. The damage arose during and after stoppages of the furnace, when the blast was obstructed in its passage upwards by the settlement of the materials in the furnace, so that the atmosphere rushed down to meet the ascending gases, and, of course, caused a very high local temperature. His practice was to exclude the atmospheric air as much as possible. The affinity of the gases for oxygen was so great that the air leakage raised the temperature quite sufficient for safety, whilst the full combustion of the gaseous escape would melt down the bricks in the flues, and destroy the texture of the iron tube. It was not possible for him to say what combinations took place at high temperatures, where carbonic oxide, carbonic acid, hydrogen, and nitrogen, were mixed in such proportions. At any rate, he found a smothered combustion to be the most suitable and economical for the purposes in view. He was happy to say that, at length, the application of the gaseous escape had been tried in Scotland; and that at Dundyvan and elsewhere it was now in successful operation. The peculiar quality of the furnace coal of Scotland being what was called in South Wales "free burning," which, when put into the furnace raw, coked sufficiently in its descent, gave out an enormous escape, so much so that, upon a rough estimate, he calculated that the waste from one furnace in Scotland was sufficient to heat the blast, and to raise the steam for three. With anthracite coal, the minimum effect was obtained, as it was a dense fuel of nearly 95 per cent. of solid carbon; but in Scotland there would be an enormous surplus at the tunnel head. He observed that the saving at the Dundyvan Ironworks was stated to be about 1¼ tons for each ton of iron produced. Supposing, therefore, 600,000 tons of iron to be the produce of Scotland, and supposing the value of the coal used to be 3*s.* a ton, the saving that would thus be effected on the make of Scotland would amount to 112,500*l.* a-year; to which might be added 20,000*l.* a year of saving in wages and repairs, which would make a total saving of 132,500*l.*, or about 4*s.* 5*d.* a ton on the produce of Scotland, which on the present price of 44*s.* per ton, was about 10 per cent. on the value. If the gaseous escape could be extended to the uses of the forge, a further saving of three tons of coal would be effected,—thus making, at least, a saving of 20*s.* a ton on all the iron manufactured into bars, sheets, and rails.

Mr. G. BEATTIE gave a description of his new Door Spring, and exhibited one of the springs in working order—the motive power being the pressure of the atmosphere. Mr. Beattie's application of this natural law is simple in the contrivance. When the door is opening, it withdraws a tight piston from the closed end of a cylinder, which leaves a vacuum behind the piston, and the pressure of the atmosphere upon the piston forces it back to its place, and closes the door. This cylinder has an exhausted chamber in connexion with it for giving the door a maintaining power when shut. There is also working with the first cylinder and piston a dwarf cylinder and piston for regulating the speed the door is wished to be closed at, which has perfect control over the travel of the door, either in allowing it to shut at once or to take any given time. The advantages this door-closer possesses are that the resistance is uniform when opening the door; and when shutting it there can be no increase of speed beyond that to which it is set, and consequently no slamming or noise.

Mr. STEVENSON made a statement of the result of certain observations made by him on the Force of the Waves with reference to the Construction of Marine Works. The object of Mr. Stevenson's experiments is to ascertain by means of a self-registering instrument the force of the waves per square foot of surface. The instrument consists in a disc on which the sea impinges, and the impact is registered by means of a spiral spring. The result of the experiments hitherto made, may be stated to be a force of about 1½ tons per square foot for the German Ocean, and of three tons for the Atlantic Ocean. The experiments from which these results were obtained being made at the Bell Rock and Skerryvore Lighthouses.

'On the Limits to the Velocity of Revolving Lighthouse Apparatus, caused by the time required for the production of Luminous Impressions on the Eye,' by Mr. SWAN.—Mr. Swan having referred to the well-known fact that the impressions of light remain for a definitive portion of time, about one-tenth of a second, said that no experiments so far as he knew had been made as to the time required for making the impression. His experiments had been undertaken with this view. The brightness of the impression he found to be in proportion to the time of making it. When the time was one-fiftieth of a second, for example, the brightness of the impression was about one-tenth of the brightness of the full light. From this Mr. Swan inferred that the light could not exceed a certain rate of revolution, otherwise a sufficiently vivid impression could not be made upon the eye.

### TUESDAY.

'On Improvements in Valves and Stop Cocks for regulating the Passage of Fluids,' by Mr. G. BUCHANAN.—Mr. Buchanan explained the principles of his improved valves or stop-cocks, and illustrated their operations by various experiments on working models.

Prof. DONALDSON gave an explanation, illustrated by numerous experimental examples, of the apparatus invented by the Baron De La Tour, for producing Musical Sounds, whether in air or water.

Mr. BUCHANAN read a paper 'On the Construction of the Rubble Bridge at Ashestiel.'

The PRESIDENT then communicated the substance of a note which he had received from M. Jules Guyot, claiming the priority of the invention of the tubular bridge, and contending, it would appear, that English engineers had taken the idea from him.—Sir C. PASLEY said that Mr. Stephenson laid claim to the invention of iron girders, whether great or small, and upon this he rested his claim to the invention of the tubular bridge. He had seen his first idea, which was rejected by the Admiralty from its not affording space enough for the navigation of the Strait. His next idea was two oval tubes, resting upon a pillar on the Britannia Rock. He believed that up to this time no idea had been formed of a tubular bridge. The next step was the rectangular form, which was shown to be the best, by the experiments of Fairbairn. He thought that the particular form was due to Fairbairn, while he believed the original idea of the tubular bridge to be due to Stephenson.—Sir D. BREWSTER observed, that if Stephenson admits, which he seems to have done, that the invention of the girder was the invention of the tubular bridge, then it certainly did follow that, just as a telescope of a foot long was as much a telescope as that of Lord Rosse's, the invention was due to Stephenson. He did think, however, that Stephenson had claimed too much, and the risk was, he would get credit for less than was his due.—Dr. ROBINSON remarked that if the letters arising out of the controversy touching this affair between Stephenson and Fairbairn were to be relied on, he was of opinion that Stephenson had extended his claim too far. It did appear to him (Dr. Robinson) that up to a late period Mr. Stephenson had no idea at all of any other than the tensile force, and that the resistance to a compressive force had not yet entered his mind.—The ASTRONOMER ROYAL expressed his great regret that a controversy of this kind had been admitted into the British Association. He protested against all discussions of this kind, as being foreign to its objects, and calculated in no small degree to disturb the harmony of its deliberations.—Sir D. BREWSTER having been boldly told when in France that the idea of the tubular bridge had been stolen by the English, he felt bound to defend his countrymen from such an allegation. He did not see why the discussion could not be conducted in kindness, and with the simple idea of determining the truth.

Sir D. BREWSTER made a communication 'On a Tabular Crane proposed by Mr. Fairbairn.

'On the Dynamic Equivalent of Current Electricity, and on a fixed scale for Electromotive Force in Galvanometry,' by Mr. W. PETRIE.—The dynamic value of a current of voltaic electricity is represented by the product of the rate at which electro-chemical action is taking place at any cross section of the current, (in other words, the quantity of the current), and the electromotive force with which the current is sustained, which may be briefly termed its energy or intensity, (provided the idea of quantity be kept distinct from this). The first object was to secure such units of comparison for both these elements as should be at all times recoverable. This is given in respect of quantity by the rate of chemical action, and the atomic weights. In respect of intensity of the current, we have no such fixed data, and the intensity of most voltaic arrangements cannot be relied on as constants for comparison. But the elements of Daniell's Battery, and those of nitric acid batteries with negative surface of platinum, carbon, or cast-iron, give an electromotive force or intensity that can be recovered with considerable exactitude, if uniformity of circumstances, materials, &c. be tolerably attended to: these, therefore, may be used to give a fixed and recoverable point in a galvanometric scale of intensity. Now it so happens, that if we assume the degrees of the scale to be of such a size that the intensity of Daniell's (standard) elements shall be 60 of the degrees, temperature be-

ing 70 Fahr.—that of nitric acid batteries will be from 100 to 112 of the same degrees; the author, therefore, has always used this scale, to which all other voltaic arrangements can be referred. Which scale, he would suggest, would be most conveniently used in assigning the electromotive power of electric currents from any source. The mean result of careful experiments, tried directly and conversely, is that a voltaic current of one unit in quantity, (or that from one grain of zinc electro-oxidized per minute) and of 100 degrees intensity, represents a dynamic force of 302½ pounds raised one foot high per minute. This datum is of great interest as a scientific truth in connexion with the other correlative agents of nature, (heat, electricity, light, and chemical affinities, neuralgic power, &c.), most of which we may hope soon to see reduced to a mutually comparable relation to each other, in terms of the great centre and medium of comparison, mechanical force. This paper was accompanied by a table of the relative and absolute powers of electro-motors.

'On the application of Electricity and Heat as Moving Powers,' by Mr. W. Petrie.—From the dynamic equivalent of electricity already given, we can infer an important fact, that one horse power is the theoretic or absolute dynamic force possessed by a current of electricity derived from the consumption of 1·56 (one and fifty-six hundredths) pound of zinc, per hour, in a Daniell's battery. But the best electro-magnetic engine that we can hope to see constructed cannot be expected to give more than half or a fourth of this power; in any case we see here the limit of power, which no perfection of apparatus can make it exceed. The peculiar mode in which the electric current produces dynamic effects has led to much miscalculation respecting the power obtainable from it. In any sort of electric engine the material to which the neighbouring current gives motion, whether it be another moveable current, or, what is more usual, a magnetic body, is impelled in one direction with a constant force, and this force, whether it be attraction, repulsion, or deflection, is, like the power of gravity, sensibly constant at all velocities, however fast the body recedes before the action of the force; provided only the same quantity (per minute) of electric current be maintained. This is quite different from the action of steam power, in which, the faster the piston moves the greater is the volume of steam per minute that must be supplied to move it, or else the less will be the power with which it moves. This fact, then, that the force with which an electric current of a given "quantity" moves the machine is the same at any velocity of motion, bears no analogy to the case of steam, but would indicate that the dynamic result obtainable from a given electric current might be infinitely great; and so it would be, were it not that the part moved always tends to induce a current in the wire in the reversed direction; and this inducing influence, which increases with the velocity of motion, conflicts with the original current, and reduces its quantity, and consequently reduces the power of the motion, as well as the consumption of materials in the battery. Some have imagined that possible alterations in the position of the parts of the machine, or in its mode of action, would avoid the evil, or even might make the induced current to flow with the primary current instead of against it; the impossibility of this, though not readily proved in detail, can be at once proved by reference to general principles; it would, if true, be a creation of dynamic force; the evolving an unlimited force from a limited source. The tendency to an opposing induced current in the primary wire must, therefore, be involved in the very principle of the system; so that no ingenuity can ever get rid of the retarding influence of the induced action; and the only way to overcome its power, so as to maintain the primary current from falling below a given rate or quantity, when the machine is allowed to attain rapid motion, is to increase the electro-motive power of the battery, the intensity (not the quantity) of the current, so that it shall be less affected by the opposing induction. The practical importance of these not altogether unknown truths may justify the above somewhat particular notice of them. For want of a clearer apprehension of them, inventors have misapprehended the direction in which improvements were to be made, and much ingenuity and means have been wasted. Some of the best electro-magnetic engines of other inventors, that have been properly tested by the author and others on a practically useful scale, have only given a power at the rate of 50 to 60 lb. of zinc, per horse power, per hour. The smallness of this power in comparison with the absolute value of the current (1·56 pound zinc, per horse power, per hour,) should not occasion surprise if we consider the present case of steam after many years of improvement. According to the determinations of Joule and of Rankine on heat, 1 lb. of water raised 1° of temperature, is equivalent to 700 lb. weight, raised 1 foot. The author thence proceeded to show that the best Cornish engines only yield one fourteenth of the power that the combustion of the carbon actually represents, and many locomotives only one hundredth part;—showing what great rewards may yet await the exercise of inventive genius in this department, and that we need not wonder that we have as yet only obtained one thirty-second part of the power possessed by electricity. But it is to be remembered that there is a far greater likelihood of obtaining a larger proportion of the real power from electricity than from heat owing to the character of the two agents. The author then proceeded to explain the reasons why so little of the power of heat could be obtained in a useful form even in the best steam-engines, and what were the difficulties for invention first to overcome, in order to a better result. In the case of electricity however, there is no analogous difficulty, but we have instead, the difficulty and expense of developing current electricity by the chemical actions now requisite. If carbon could be burnt or oxidized by the air, directly or indirectly, so as to produce electricity instead of heat, 1lb. of it would go as far as 9¼lb. of zinc (in a Daniell's battery) chiefly because there are as many atoms in 1lb. of carbon as there are 5¼lb. of zinc, and partly because the affinity (for oxygen) of each atom of (incandescent) carbon is greater than that of an atom of (cold) zinc, minus the affinity of the hydrogen for the oxygen in the water of the battery. Apart, however, from such prospects of improved means of obtaining electricity, its favourable feature, on the other hand, in comparison with heat, is the reasonable expectation that we may obtain from electricity a considerable portion of the power which the author has determined as being the dynamic equivalent of the electric current.

'On the Powers of Minute Vision,' by Mr. W. Petrie.—Results from experiments for determining the best sort of station-marks, and the errors liable, in observing with optical instruments that measure on the principle of bringing two reflections together. The experiments were performed in bright daylight (but not sunshine), being light of the maximum of advantage for perceiving black against a white ground. The general circumstances of the experiments were arranged rather to determine the facts of common practice, than the theoretic powers of vision. The author then detailed the various distances at which circular spots, lines, &c., white on black as well as black on white, could be seen, the distances being given in terms of the breadth of the object seen. An arrangement of lines was described, by which an alteration of their position to the extent of only *one millionth* part of the distance of the observer was made visible. One result of the experiments would be to show what should be the proper proportions of parts to be observed in forming *letters* to be read with the greatest distinctness at a distance,—a subject of much practical use in the present day, and admitting of a strictly scientific system, although generally left to the fancy of incompetent persons. *White* letters on a *black* ground should have their component lines of only half the breadth that *black* letters should have on a *white* ground. The direction of the eye, while appearing to gaze *steadily* at any object, does in reality keep *wandering* to an imperceptible distance on every side of the object looked at, but very rapidly. This *wandering* is not accidental or an imperfection of sight, but an essential feature of vision; because it is not the *continuance* of an impression that is perceived (by any of the animal nerves), but its commencement and termination, or, more strictly speaking, its increase and decrease. This principle is probably analogous to that by which a magnet creates an electric current in a neighbouring wire, not by its *constant presence*, but by the increase or diminution of its influence, either by a variation of its *power*, or of its position. This wandering propensity of the eye was shown to account for the relative facility with which different sorts of marks were seen at great distances: it takes place, apparently, in a minimum case, to the extent of an angle of 1 in 2,500. A dislocated line (as in a vernier), its *falt* being half its breadth, can be perceived to be so at a distance of 10,000 times its fault if black on a white ground; and at 12,000 times, if white on a black ground. It shows itself, however, by giving the line a *less steady* appearance, than a perfectly even line would have, when narrowly watched, by running the eye along the line, at about half as far again. Experiments were then described, on the visibility of the positions of the *ends* of lines, and of *hiatuses* in lines, and of *square* dots as compared with round. But the last conclusion of practical importance was in respect of observing the angular position of station-marks, or of stars, by reflection, as in a sextant. From these experiments it appeared that the position of two closely adjacent dots or images, in sensible parallelism to a given direction, while it affords one of the *simplest* kinds of observation, is more accurately observable than their actual coincidence, or even than the junction of two lines, as if in a vernier.

After some observation by Mr. D. Stevenson 'On the Visibility of Beacon Lights,'—the President expressed a desire that Mr. Petrie would continue his researches on the subject, with regard to objects of various colours.

'On the Subject of a Telescope Light for Rifles,' by Prof. P. Smith.—Instead of the eye having to look at three points, viz., the niche at the eye, the niche at the extremity of the barrel, and the object to be hit,—there were but two in his rifle, the cross wires in the telescope and the object.

Mr. Usher then gave an account of his Steam Plough, which he afterwards showed in operation.

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| Sum Assured. | Time Assured. | Sum added to Policy in 1841. | Sum added to Policy in 1848. | Sum payable at Death. |
|---|---|---|---|---|
| £5,000 | 13 yrs. 10 mths. | £653 6 8 | £787 10 0 | £6,470 16 8 |
| 5,000 | 1 year | ... ... | 112 10 0 | 5,112 10 0 |
| 1,000 | 12 years | 100 0 0 | 157 10 0 | 1,257 10 0 |
| 1,000 | 7 years | .. .. | 157 10 0 | 1,157 10 0 |
| 1,000 | 1 year | .. .. | 22 10 0 | 1,022 10 0 |
| 500 | 12 years | 50 0 0 | 78 15 0 | 628 15 0 |
| 500 | 4 years | .. .. | 45 0 0 | 545 0 0 |
| 500 | 1 year | .. .. | 11 5 0 | 511 5 0 |

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| Date of Policy. | Sum Insured. | Original Premium. | Bonuses added subsequently, to be further increased annually. |
|---|---|---|---|
| 1806 | £2500 | £79 10 10 Extinguished | £1222 2 0 |
| 1811 | 1000 | 33 19 2 ditto | 231 17 8 |
| 1818 | 1000 | 34 16 10 ditto | 114 18 10 |

Examples of Bonuses added to other Policies.

| Policy No. | Date. | Sum Insured. | Bonuses added. | Total with Additions, to be further increased. |
|---|---|---|---|---|
| 521 | 1807 | £900 | £982 12 1 | £1882 12 1 |
| 1174 | 1810 | 1200 | 1160 5 6 | 2360 5 6 |
| 3392 | 1820 | 5000 | 3558 17 8 | 8558 17 8 |

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